Costs and Quality of Services in Public Hospitals in Zimbabwe
Implications for hospital reform

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By

Charles Hongoro

With the Supervision
of
Dr Barbara Isobel McPake

Health Policy Unit
Department of Public Health and Policy
London School of Hygiene and Tropical Medicine

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Abstract

Hospitals come under the focus of health planners and policy makers because they invariably consume large and increasing amounts of health care resources and performance is commonly believed to fall short of that possible. The common response by governments to this situation has been to implement hospital reforms. However, emerging evidence from impact evaluations of such reforms shows little clear evidence of performance enhancement. It is argued in this study that hospital reforms in most countries are implemented without enough understanding of current performance, or knowledge of hospital behaviour. Such information is necessary for effective design, implementation and evaluation of reforms.

The aim of the study was to measure hospital performance and contribute to the understanding of its determinants. The role of internal organisation and management to hospital performance has been underplayed in most studies such that the workings of the hospital remain a "black box". The study sought to demonstrate that understanding hospital performance entails understanding not only the technical relationships of dimensions of hospital performance but also the institutional context, and behaviour of individuals or groups within it who ultimately shape hospital behaviour.

A multiple case study approach was used to study six tertiary hospitals in Zimbabwe. Hospital performance was first assessed through analysis of utilisation statistics. This was followed by an assessment of two dimensions of hospital performance: costs and quality of inpatient services. Costs were measured using standard cost accounting methods at hospital, ward and patient level. At patient level, a combination of prospective micro-costing and top-down costing methods was applied to cohorts of patients suffering from selected tracer diseases: 207 malaria and 158 pulmonary tuberculosis cases. The quality of hospital inpatient services was also measured at hospital and patient level using structural and process approaches. The relationship between cost and quality of services was then explored at patient level using tracer conditions. A triangulation of methods was then used to explore internal organisation

and management: staff interviews, observations, attendance at hospital meetings and review of administrative records.

Analysis of activity statistics showed that the six hospitals had different levels of activity although they had similar roles in the referral hierarchy. Distinctive unit cost patterns were observed across the hospitals. Unit cost variation across hospitals was generally similar at hospital, ward and patient level. The results from the analysis of activity statistics were predictive of hospital cost classifications. The quality of hospital services varied across hospitals from both structural and process perspectives. There was little convergence in results from hospital level structural quality assessment, and process quality assessment. Cost-quality relationships in inpatient care showed a distinct pattern across tracer diseases, which permitted classification of the six hospitals into three performance categories. These classifications were used to relate quantitative and qualitative results of the study.

The institutional contexts within which public hospitals in Zimbabwe operate is explored and described. There are fundamental policy design weaknesses related to the way hospitals are financed, governed and managed, which affect hospital performance. Hospital staff appears apathetic about hospital performance because of lack of appropriate incentives. Several hospital internal factors were reported as impinging on hospital performance. These factors can broadly be summarised as lack of management capacity and skills, inappropriate internal organisational and management structures, and staff reward systems. The current incentive structure at individual and institution level does not engender performance improvement.

Relative hospital performance did not vary systematically with different institutional characteristics. For instance, compliance or non-compliance with mandated organisation and management structures did not account for performance differences whilst weak associations were found between relative performance, and differences in management capacity and skills. The absence of direct relationships between institutional characteristics and relative performance was not unexpected given the exploratory nature of the study and the possible multiple interrelationships between these factors.

Nonetheless, the study systematically describes and exposes current weaknesses in the internal structure of public hospitals in Zimbabwe, and identifies those internal organisational and management features considered important to performance.

The study concludes that there is considerable scope for improving hospital efficiency and quality of services (with available resources) by changing internal organisation and management of hospitals. Of particular importance is the need to change and align incentives (monetary and nonmonetary) at both individual and institution level in ways that promote performance improvement.

Table of Contents

List of Figures

List of Tables

Abbreviations

AIDS	Acquired Immuno-Deficiency Syndrome
ANC	Ante natal care
ACC	Average Cost per Case
ACD	Average Cost per Day
BOR	Bed Occupancy Rate
BTR	Bed Turnover Rate
CBR	Crude Birth Rate
CMED	Central Mechanical and Engineering Department
CPE	Continuous Professional Education
DALYs	Disability Adjusted Life Years
DDMH	District Designated Mission Hospitals
DOT	Directly Observed Treatment
DRG	Diagnosis Related Groups.
EDLIZ	Essential Drug List for Zimbabwe
ESR	Erythrocyte Sedimentation Rate
EUROQol	European Quality of Life
FBC	Full Blood Count
FCE	Finished Consultation Episode
FY	Financial year
ICD	International Classification of Diseases
ICU	Intensive Care Unit
GMO	General Medical Officer
GMS	Government Medical Stores
HAB	Hospital Advisory Board
HE	Hospital executive
HIV	Human Immuno-deficiency Virus
HLE	Health Life Earned
HMO	Health Maintenance Organisations
HMT	Hospital management team
HOD	Head of Department
HRGs	Health-care Resource Groups.
HSF	Health Services Fund
ICS	Inter-censal survey
LMIC	Low and Middle Income Countries
LOS	Length of stay
MCH	Mother and Child Health
MOH	Ministry of health
NA	Nurse Aid
NHS	National Health Service
OPD	Outpatient department
PPO	Preferred Provider Organisations
PPI	Provider Performance Index
PSC	Public Service Commission
PTB	Pulmonary Tuberculosis
QALY	Quality Adjusted Life Years
RDC	Rural District Council
ROI	Return on Investment

SCPR	Social Council for Policy Research
SCN	State Certified Nurse
SDF	Social Dimension Fund
SIC	Sister-in-Charge
SRN	State Registered Nurse
SSA	Sub-Saharan Africa
UK	United Kingdom
ZEDAP	Zimbabwe Essential Drugs Action Programme

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Dedication

I dedicate this thesis to my son and daughter, Danleen and Charlotte.

CHAPTER 1 INTRODUCTION

1.0 Introduction

Hospitals have been at the fore of decision-makers', programme managers', planners' and even politicians' agendas in the last three decades. Key concerns have been hospital cost escalation, funding options, efficiency and effectiveness. Various forms of financing and organisational reforms have been implemented in response to these problems. What is evident is that most of the reforms planned or being implemented especially in low and middle-income countries (LMICs) lack empirical evidence. Many countries have been following global reform trends even in circumstances where contexts differed markedly. The study argues that it is necessary to measure hospital performance and understand its determinants as a precursor to implementing major reforms. It also emphasises that an analysis of internal hospital organisational factors has been a neglected but vital area in designing policies geared to improve hospital performance. This chapter presents common problems in the hospital sector in Zimbabwe in the first section. It then briefly describes health sector and proposed hospital reforms in sections two and three respectively. Section four describes the study rationale, and chapter ends with a description of how the thesis is organised.

1.1 Hospital costs and quality of services

Hospitals are an important part of a health care system as they provide essential curative and supportive services to primary care facilities. However, they consume significant and disproportionate amounts of resources compared to non-curative services. In the financial year 1994/95, central and tertiary hospitals accounted for more than 33% and 11% of health expenditure respectively. All hospitals together consumed 70% of total Ministry of Health expenditure (Table A1). This pattern of resource consumption has not significantly changed over the years. Despite this skewed expenditure pattern, problems of hospital cost escalation continue unabated. Paradoxically, there are continued claims that public hospitals are under-funded, which raises questions about the efficiency of hospital services delivery and the quality of services produced.

Hospital care is by nature expensive but there is likely to be considerable scope for doing more with available resources. This problem is not unique to Zimbabwe and obtains in both developing and developed countries. Governments have responded to these problems by introducing wide-ranging health sector reforms. A common feature of these reforms is the desire to change the way health care markets work and the organisation of health services in general.

1.2 Health sector reforms

In Zimbabwe, health sector reforms were triggered by results of a public service review in 1987 which showed that the public service was inefficient and required rationalisation. Social sectors including health were equally the target of criticism. Proposals for reforming the health sector were made, particularly focusing on strengthening management, health financing, contracting out, regulation of the private sector and decentralisation of health services (MOH 1995). Implementation of these reforms has been slow partly because of the prevailing turbulent social, political and economic situation.

The most dramatic change yet to be introduced is decentralisation of health services. The government's objectives in decentralisation are threefold: (1) to improve health status and consumer satisfaction through effective and quality health services; (2) to improve equity by improving access to quality care for disadvantaged groups; (3) and to obtain greater value for money, through increased allocative and technical efficiency (MOH 1996). Health services planning and management will be decentralised to Rural District Councils (RDCs)[1]. The health care system has traditionally been hierarchically organised based on the principles of primary health care. It has four tiers: the centre, the region, the district and the primary level. The centre is responsible for setting national policies and guidelines, monitoring standards and quality of services, allocating resources, regulation and managing vertical programmes. The basic role of the regional level is to ensure that districts adhere to government policies, and allocation of resources. There are eight provinces in the country and each has at least seven administrative districts. Over the years, the management system has been characterised by unnecessary bureaucracy, lack of community responsiveness, inefficiency and poor quality of services (MOH 1996). To rationalise the system, a new management and planning structure has been proposed in which districts, provinces and hospitals are to be given more devolved powers (Annex I). Decentralisation of services will entail creation of autonomous boards to run districts and hospital services at all levels. Service contracts will be used in financing health services thus creating a quasi-market through a purchaser-provider split.

1.3 Hospital sector reforms

The hospital sector is organised as a four-tiered system (Annex I.I) with six national referral (central) hospitals. Each of the eight administrative provinces has a tertiary (provincial) hospital that acts as a referral centre for other hospitals in that province. There are about 29,000 public hospital beds, of which 25,000 are in hospitals[2]. The number of beds per inhabitant is 2.8 per 1,000. Mission hospitals contribute a total of 7,000 beds mostly at secondary and primary care level (MOH 1997). Hospitals are managed by policy prescribed executive committees. A typical hospital executive consists of a medical superintendent; a matron, an administrator, a pharmacist and a chief nursing tutor (MOH 1982).

The disproportionate share of resources consumed by the hospital sector has been the major impetus for hospital reform in Zimbabwe. Ongoing and proposed changes have been geared towards improving technical and allocative efficiency, and quality of services. Three such reforms merit attention: hospital autonomy, contracting out of services, and management strengthening. Hospital autonomy is considered as one of the mechanisms for achieving wider health sector reform goals such as improving value for money, efficiency, equity and rationalisation of health services. Albeit there are no specific objectives for autonomous hospitals in the policy documents, autonomy is generally considered to have three implicit objectives: (1) improvement of allocative

[1] Rural District councils are the lowest levels of local government in the country.
[2] 2-3% of the beds belong to central hospitals

efficiency and equity in the health sector, (2) improvement of internal efficiency within the hospitals, and (3) improvement of consumer responsiveness and accountability (McPake 1996).

Under autonomy, hospitals are to be run by statutory independent boards set up by the Minister of Health. Such boards will be "corporate" bodies capable of employing staff, owning and disposing of assets, acquiring and disposing of land and buildings, borrowing money for capital investment and retaining fee revenue, among other things. Hospital funding will be by block service contracts with provincial and national authorities—similar to UK NHS reforms of 1991 (Glennerster and Le Grand 1995). One central hospital (Parirenyatwa) is partially autonomous and is managed by a board. It is funded on the basis of a non-contractual annual grant from government. A similar autonomy structure is to be applied to all other hospitals except that funding will be based on block contracts. Some aspects of autonomy have already been implemented, for instance, hospital fee retention in 1996. Hospitals keep collected revenue for improving service quality and quantity. Most hospitals have Hospital Advisory Boards (HAB) members of which are appointed by the Minister of Health from the local community. The role of these boards is limited to community involvement in the wellbeing of the hospital. For instance, fund raising. Reform proposals indicate that these boards will be transformed and given more powers to run the hospitals.

Along with creation of autonomous hospitals, contracting out of some services has been introduced with the principal aim of divesting public functions, cost saving and improving quality of health services. Hospitals can now solicit the services of private providers for a variety of services such as security, laundry, equipment maintenance and others. Within the public sector, contracts are conceived as a means of creating transparency in trading, increasing accountability and controlling costs. The use of contracts, within or external to the public sector, in purchasing health services is a relatively new phenomenon in Zimbabwe.

Over the last five years the MOH has been investing significant amounts of funds into management strengthening through health personnel training. Decision-makers, programme managers, planners, hospital managers and others have been trained in executive management and /or general management with the aim of improving individual and system capacity. However, the impact of such training programmes has never been evaluated.

1.4 Study rationale

The focus of this study was to contribute to an understanding of the determinants of hospital performance. This is a fundamental issue that seems to be overlooked by policy makers in designing hospital reforms. It is assumed, for instance that giving hospitals greater autonomy, use of contracts and management training, creates appropriate incentives for improved performance. This might not be the case in practice. Evidence from LMICs shows limited success in contracting out of services (Bennett et al., 1997), and hospital autonomy (Collins et al., 1996, Needleman et al., 1996). In the UK, similar conclusions have been reached for NHS trust hospitals (Peck and Spurgeon 1993, Bartlett and Le Grand 1994, Klein 1995, Ham 1997, Söderlund et al., 1997). The reasons for limited policy success are not clearly understood. Furthermore, reforms in LMICs tend to be implemented without adequate context-specific empirical evidence. Hospital organisational reform is expensive and time-consuming (Over and Watanabe 1998), and therefore needs to be thought through thoroughly.

This study has both practical and theoretical contributions to make. As a starting point, it seems logical in the reform process to explore and understand current public hospital behaviour (performance) and its determinants. Information generated can then be fed into policy design, implementation and impact evaluation. Such information is vital in ensuring that incentive structures are adjusted appropriately to achieve policy aims (Bartlett and Le Grand, 1994). Gilson (1992) argues that "through evaluation of current performance and identification of the key factors influencing it, research can generate improved monitoring systems, key information needs and identify steps to improve performance ". The use of service contracts in the hospital sector is a new development, which requires knowledge and information on costs and quality, which is not currently available. Anecdotal evidence suggests lack of public sector capacity to write effective contracts and inadequate information to permit such contracts to be designed and evaluated. Information on costs and quality is important in judging the merits of contracting and self-providing (Mills 1997), and in inferring pricing and purchasing decisions. In addition, evaluations of reform policies have been constrained by absence or incomplete baseline data to allow evaluators to make judgements on the success or failure of policy changes. The study sought to provide the necessary baseline data.

This study represents one of the first attempts to conduct a detailed analysis of public hospitals' internal organisation and management, incentive structures, and how they influence hospital performance. An investigation of the internal organisation of hospitals, that is how organisational characteristics, professional and management practices affect behaviour is a key research priority for informing hospital sector reforms. Most behavioural cost studies have not explicitly incorporated organisational variables in theory or in empirical research, except hospital size, teaching status and ownership. The workings of hospitals remain a 'black box' (Sloan and Becker 1981, Conrad et al., 1996, McKee et al., 1997, Aiken et al., 1997). The proposed reforms provide a unique opportunity for evaluating current performance. The study also attempts to show that performance improvement is not only a product of identifying deficiencies and taking appropriate action, it is determined as much by how providers respond to changes in their environment (Wyszwianski 1988). Champagne et al (1993) argue that managers (providers) play a critical role in performance, through their behaviour, attitudes (e.g. risk taking and innovation), and cognitive structures (expertise and analytical ability).

The aim of the research was to contribute to an understanding of the determinants of hospital performance. In order to do that, the study first measured performance: hospital costs and quality of services in six tertiary hospitals using a variety of methods. Second, the relationship between costs and quality of services was explored within the context of relative performance assessment. Third, the study qualitatively explores the inter-relationships between hospital structure, organisation, management and incentives, and performance. Based on these sets of analyses, some policy implications are drawn to inform hospital reform policy in Zimbabwe, and other LMICs planning or implementing similar reforms

1.5 Organisation of the thesis

Chapter 2 presents a review of relevant literature which includes the following subject areas: problems facing public hospitals in Sub-Saharan Africa (SSA), relevant issues in organisation theory, theory and measurement of hospital costs and quality of services, and conceptual frameworks for assessing cost-quality tradeoffs. The chapter ends with a summary discussion and conclusions from the literature review. Chapter 3 presents the study objectives and a summary of the methods used. Chapter 4 presents the country profile and a description of the study settings. In Chapter 5 conceptual issues concerning the measurement and interpretation of hospitals outputs are discussed and followed by results of hospital performance assessment using activity statistics. Chapter 6 presents results on hospital-level cost analysis. Patient-level costs analysis results are presented in Chapter 7. This is followed by hospital quality analysis results in Chapter 8. Chapter 9 presents results of cost-quality tradeoffs analysis. Chapter 10 presents a conceptual discussion of determinants of organisational performance followed by results of the qualitative study. The chapter ends with a comparative analysis and summary of results. Chapter 11 presents an overall discussion of methods and results of the study. Chapter 12 presents study conclusions, methodological, theoretical and practical contributions of the study, policy implications and areas for future research.

CHAPTER 2 LITERATURE REVIEW

2.0 Introduction

This chapter reviews relevant literature on hospital performance. Section 2.1 presents a review of generic problems affecting public hospitals in SSA. Aspects of organisational theory that are relevant to organisational research are reviewed and put into context in Section 2.2. This sets the background for a review of concepts and methods for measuring hospital quality and costs, and empirical evidence (Section 2.3 and 2.4). The merits and demerits of different measurement methods are examined. This is followed by a review of cost-quality tradeoffs in assessing relative performance and how this relationship may be explored (Section 2.5). The chapter ends with a summary discussion and conclusions from the literature review (Section 2.6).

2.1 Public hospitals in Sub-Saharan Africa

2.1 The hospital market

Hospital markets in SSA are not as developed and diverse as in Western countries. Hospitals are predominantly public and private not-for-profit (usually church-related) hospitals (Gilson et al., 1997, Flessa 1998). The latter have historically provided complementary services to public services especially in those areas not covered by public services. Unlike not-for profits in Western countries (Bays 1979, Judge and Zeithmal 1992), the majority of church-related hospitals provide services to the most vulnerable and needy groups without surplus or profit motives. There is a small but rapidly growing private for-profit hospital services market in the region especially in urban settings. For instance, it is estimated that the number of private beds in Zimbabwe more than doubled in the last five years. In South Africa the number of private beds increased by 113% from 1988 to 1996 (Coburn et al., 1998). This rapid growth in many countries has been fuelled by two factors: (1) expansion of private and social health insurance, community financing schemes, and (2) deterioration of public health services. However, this growth of the private sector has created both benefits and problems. The benefits include, among other things: increased consumer choice, better perceived quality of services, increased coverage (or access) and retention of key personnel (e.g. specialists) in public sector. The problems emanate from lack of appropriate government policies and legal frameworks for effective public-private partnerships (Mills et al 2000). Private sector growth in South Africa is argued to have negatively affected the public sector through staff drainage and loss of paying patients (Monitor Company, 1996, Coburn et al., 1998). Nevertheless, the dominance of public hospitals in the region and mounting evidence of poor performance has increased attention on the activities of these hospitals in recent years (McPake 1996, Van Lerberghe et al., 1997).

2.2 Role of public hospitals

The role of public hospitals in the health care system influences the service mix and technology that they employ. A purely private hospital has the freedom to decide what service to produce and how to produce it using economic criteria. The choice of what services to produce is determined by viability. There must be potential demand for the services, which is signified by the existence of such things as insurance schemes (public and private), possibilities of employer-based contracts, government or out-of-pocket payments. The same is expected of autonomous "public" hospitals in which management boards make corporate decisions. Private hospitals strive to be efficient and cost effective to optimise revenue. However, the role of a public hospital in the health care system imposes certain limitations to what service it provides. For instance, tertiary hospitals are referral centres supporting a network of secondary or other lower level hospitals, and primary care facilities (both private and public). Consequently, the services they provide must be supportive of referring institutions. This means that the product range of the hospital is not necessarily based on market viability criteria but on what the hospital is expected to do in the health care system, that is, to be a referral centre and to provide services according to need.

There are problems associated with such broad-based provider systems because the performance of referral centres depends on the level of performance of referring units. If referring units operate inefficiently, then their inefficiencies might be "exported" to referral centres. This form of inefficiency arises through late and inappropriate referrals (false positive or unnecessary referrals). Sometimes patients are referred for non-technical (clinical) reasons because of input shortages (e.g. drugs and doctors) at lower level facilities (Barnum and Kutzin 1993, Van Lerberghe et al., 1997, Sanders et al., 1998, Fiedler et al 1998). It is not uncommon to have secondary hospitals without doctors in LMICs. Consequently, patients that could be treated at lower costs at lower level hospitals end up being treated at the most expensive level. This creates allocative inefficiency problems in the health system. Problems of cost shifting and patient shifting from the lower levels to the tertiary level are likely to occur. This seems to apply also to private-for-profit facilities depending on reimbursement methods used and the insurance status of patients. Tertiary hospitals are thus subjected to an inefficient referral system in which they are expected (by policy) to provide services to all referred cases.

2.3 Hospital costs escalation

Hospitals consume a disproportionate amount of resources compared to other health services in developing countries. For example, in Zimbabwe, Sri Lanka, Tunisia, Malaysia and Colombia central/tertiary hospitals consumed 45% (in 1993), 64% (in 1979), 69% (in 1971), 17% (in 1973) and 36% of ministry of health expenditure respectively (Barnum and Kutzin 1993, Mills 1990a). In the same countries Zimbabwe, Sri Lanka, Tunisia, Malaysia and Colombia, districts consumed 13% (in 1981), 36% (in 1979), 9% (in 1971), 39% (in 1973) and 27% of ministry of health expenditure respectively (Mills 1990a). In Angola hospitals accounted for 28.5% of development expenditure in 1992, in Egypt (in Bani Swayf) 35.8% in 1993 (Wolowyna and Cressman 1996) and in the 1980s Kenyatta National hospital in Kenya accounted for 8-15% of ministry of health expenditure (Sahn and Bernier 1995). In Ghana, 40% of health expenditure for 1981 was consumed by tertiary hospitals (Van Lerberghe et al 1997) and in South Africa hospitals consume 77% of total public expenditure in 1996/7 (Coburn et al., 1998). Despite these relatively high expenditures, problems of overcrowding, shortages of essential drugs, over-and under-staffing, low productivity, long waiting times and a host of others are not uncommon in these hospitals. Hospitals lack capacity to adjust inputs to workload, and have no effective mechanisms of cost control. There is no reason to suspect that the order of magnitude in relative resource use has changed in recent years. For instance, public and mission hospitals in Zimbabwe currently consume about 70% of MOH expenditure. This has been attributed to rapid increases in production costs, and the increasing demand for hospital services. The problem has been compounded by the HIV/AIDs scourge which has significantly increased morbidity and mortality in SSA (UNAIDS 2000).

Despite this skewed financing scenario, arguments that hospitals are under-funded persist. As earlier mentioned, public tertiary hospitals are sometimes inappropriately used in LMIC—i.e., used as first line services and for unnecessary referrals. This is caused by under-funding of secondary hospitals relative to tertiary hospitals. It would seem that finding an appropriate balance in funding between different hospital levels is likely to curb the "fire-fighting" role that referral hospitals currently play. That funding balance may be derived from defining essential service packages for each level of hospital care.

The problem of hospital cost escalation may partly be attributed to reimbursement procedures. Most public hospitals are funded through budgets: line item or global budgets. A line-item budget refers to that budget where the government budgets by specific items (e.g. drugs, personnel, provisions, etc). Movement of funds between line items is subject to rules and regulations set by government. This type of funding is usually accompanied by possibilities of extra-funding in case of cost over-runs. The objective of line item budgeting is to allow the budget holder to control spending, particularly on staffing levels, and limit the consequences of weak management (Barnum et al., 1995). The cost of tight control of local management is usually loss of operational efficiency. Use of line items sometimes restricts managers to inefficient input combinations. In addition, managers are inclined to ensure that line item budgets are spent before the end of the financial year since cost saving might result in reduced allocations in the succeeding year. However, in cases where there is lack of good local management, line item budgeting may be argued to be one of the practical alternatives. Modest efficiency gains can be realised under line item budgeting if the centre monitors production and provides performance-based incentives, such as bonuses, to local staff for improving efficiency. There is no substantial evidence that this is happening in many countries in the region.

Global budgeting refers to a total payment amount agreed in advance to cover expenditure for a given period of time. This is commonly the case with autonomous or semi-autonomous hospitals (McPake 1996). A global budget has two main characteristics: it is not itemised, which means that managers can decide on appropriate allocations across different cost items. However, it is difficult to change the budget amount over the given expenditure period. The attendant advantages are that it provides for management flexibility whilst holding managers accountable for their performance, and creates incentives for cost minimisation by reducing the quantity of inputs used. If used in tandem with contracts that specify provider performance and quality of care, it creates incentives for use of efficiency and quality criteria in resource allocation.

The manner in which the budget (global or line item) is set plays a significant role in influencing efficient behaviour. If the budget is set based on historical figures, which is common in public hospitals in LMIC (Fiedler et al., 1998), then there is a strong possibility that existing resource use patterns are maintained. If the budget is based on unit costs per fixed input (e.g. number of beds) it provides an incentive to add capital inputs (or maintain inputs even when not needed) in order to increase total revenues, leading to increased costs and excess capacity in the long run (Barnum et al., 1995). What is important in the determination of the budget is that efficiency is rewarded and inefficiency is penalised but in reality such practice is rare in bureaucratic systems. Another disadvantage of global budgeting is that it can create incentives for cost cutting at the expense of quality especially in cases where there is no contract or specification of standards of services required and poor monitoring mechanisms. Systems of hospital financing in most SSA hospitals fall into these two categories or a mixture of both. Problems that exist in the hospital sector are characteristic of the negative incentives created by such forms of hospital financing.

2.4 Competition

It is argued that the existence of competition in the hospital market engenders efficient hospital behaviour. The theoretical rationale is that in a competitive environment, revenue can be obtained only through the delivery of services on more attractive terms to patients (costs and quality) than offered by other hospitals. A big market share positively affects economies of scale, utilisation rates, learning curves[3], and quality of services (Thomson 1994). It is this market theory that has led to the introduction of internal markets (quasi-markets) in the health sector where purchasers and providers are split, and services are provided on a contractual basis as a way of promoting efficiency and quality of services amongst providers (Ham 1990, Saltman and von Otter 1992, Woodward and Wilson 1994, Glennerster 1998). Indeed, experience in the USA has shown that increase in market share is associated with increase in return on investment (ROI). Internal markets rely on the tendering process where the purchasing agency puts on tender particular services to be contracted. Providers would then compete on the basis of cost and quality. The fact that income to these providers is dependent upon the number and size of tenders they win makes it necessary that there be continuous quality and efficiency improvements. The concept of managed markets presupposes the existence of a number of players within both the private and public sectors. Such environments obtain in Western countries, especially the USA where supportive arrangements and many players exist (HMOs, PPOs, independent group practices and private hospitals) that can compete for the provision of hospital care. In less developed countries competition in the provision of hospital services is minimal, if it exists at all. This can be explained by two factors: first, the existence of few players, and second, incontestability of the markets. In developing countries tertiary or teaching institutions are mostly monopoly providers. The problem of low market concentration is compounded by the amount of regulation in this sector and the unavailability of capital which makes the market uncontestable (McPake and Ngalande-Banda 1994). The concept of competition in the provision of hospital services cannot apply to such settings. This situation makes public hospitals immune to efficiency enhancing market conditions such as competition, and that nurtures inefficient behaviour.

However, competition may not always reduce costs in the hospital sector. Thomson (1994) points out in a review of competition amongst hospitals in the USA that price competition is the weakest form of hospital competitiveness. Instead, it is non-price competition that increases hospital market share (Robinson and Luft 1985). Hospitals in

[3] This means that high throughput allows for specialisation and experience with new technology, which can reduce costs.

their endeavour to increase market share invest, for example, in sophisticated technology and high-cost amenities for patients that may or may not add to clinical improvement. However, in the process costs and prices of services increase. It is often difficult to justify such investments on economic grounds. Studies of hospital competition and hospital costs in the USA have shown higher costs in competitive hospital markets compared to less competitive ones (Ibid). Whilst experiences from the USA cannot easily be "exported" to less developed countries, this experience has public policy relevance in the sense that the absence of competition in the hospital sector has positive and negative dimensions, and suggests a role for other hospital efficiency and quality enhancing policy instruments. The issue is not just one of relevance but rather anticipating change and optimal implementation paths from developed countries' experience (Chernichovsky 1995).

2.5 Autonomy and Regulation

The hospital sector is highly regulated in most LMICs through direct and/or indirect legislation, national policies and guidelines. This form of control affects the degree of operational and strategic autonomy of hospitals and hence influences performance. The level of autonomy depends on the type of hospital, which may be private (for-profit or not-for-profit) or public. Private for-profit hospitals are autonomously run on a corporate basis by individuals or corporate boards with the principal aim of making a profit. Trustee boards usually govern private not-for profit hospitals in Western countries. There is debate, however, about their performance motives (Judge and Zeithmal 1992). In LMICs, church boards govern private not-for-profit hospitals even though they are often substantially publicly funded (90% in Zimbabwe). They operate autonomously but within broad government policies and guidelines.

This is not the case with public hospitals because they are part of a hierarchical and bureaucratic structure. National health policies tend to promote economic efficiency, equity, cost containment, and provision of public health services. Hospitals tend to have limited choice in choosing what services to produce, for whom to produce, how to produce, and how much to charge for services. Therefore, the immediate concerns of hospitals, which might well be just technical efficiency, and provisions of quality service are difficult to achieve in practice (because of equity concerns, for instance). The popular argument for having such controls has been to safeguard public interest. Policies of universal access are common across SSA countries as evidenced by the adoption of primary health care principles. In some instances, these policies are implemented in ways that negatively affect the viability of hospitals in the long run. Consequently, public hospitals continue to consume the biggest share of government funds even though problems of inefficiency and quality of service are common.

Regulations are also targeted at the quantity and price of hospital services in which case government restricts expansion of hospital services in both the public and private sector, and sets or approves fee schedules for hospital services. It would seem that regulations have contributed to slowing the pace of private sector participation in some countries, and that has meant that public hospitals remained under immense pressure. Experience in developing countries such as Zimbabwe and Thailand shows that although there is a myriad of legislative instruments governing the sector there is an apparent lack of a strong institutional structure to enforce them (Bennett 1997, Kumanarayake et al., 2000).

2.2 Arguments from Organisation theory

Organisational theorists acknowledge that understanding organisations is a complex process. This complexity derives from the multiplicity of factors that affect organisational behaviour (Handy 1993, Buchanan and Huczysianki 1997, Mullins 1999). Cole (1995) defines organisation behaviour as:

> ".. a term applied to the systematic study of the behaviour of the individuals within work groups, including an analysis of the nature of groups, the development of structures between and within groups, and the process of implementing change. The rationale of organisational behaviour is to predict and /or control individual and group behaviour in the pursuit of management goals, which may or may not be shared throughout the organisation."

This definition shows that by taking the individual and/or groups of individuals as subjects of enquiry as proposed by economic hospital behavioural models our understanding of hospitals may be enhanced. Jacobs (1974) acknowledges this view by proposing two possible approaches to analysing hospitals: that is, looking at a hospital as a total entity (organism) or as a constituency of individual players that constitute it (exchange model). The former is argued to be more complex and abstract than the latter, because in practice it is difficult to establish an overall consensus of what all individual actors aim to achieve.

Because of the diversity of factors that potentially influence organisational behaviour it is vital that organisational research focuses on specific and contextually relevant factors. At individual level incentives or broadly, motivation is key to understanding organisations. Organisation theory offers motivational theories (of which incentive theory is one) that can be selectively applied in understanding individual and group behaviour within an organisation (Buchanan and Huczynski 1977, 1997, Cole 1995, Mullins 1999). Clarity about what satisfies and /or motivates a person is particularly important in engendering performance-enhancing behaviour. Satisfaction has to do with the question "why am I working here" and motivation with the question "why work harder" (Mullins 1999, Buchanan and Huczynski 1997). A satisfied worker may not necessarily be a motivated worker, and positively changing dissatisfying factors may not necessary improve motivation (Hertzberg 1968). Performance enhancement is related to the reward system. If rewards are linked to performance and their distribution is perceived as fair, individuals are likely to work harder[4] (Perrow 1973, Pfeffer 1995, Handy 1993, Xingzhu 1999). Economic models tend to focus on monetary incentives (easier to measure) but in some cases non-monetary incentives (e.g. prestige and security) are more relevant (though difficult to measure) in enhancing individual or group performance.

The nature of the organisation itself can create incentives and disincentives for its workers. Buchanin and Huczynski (1997) argue that the organisational setting influences the behaviour of people, for instance, co-ordination, accountability, technology, structure of authority, communication and status, reward system and other management controls to which people are subjected. The emphasis of organisation theory seems to be on understanding institutional characteristics as a precursor to any attempts to predicting organisation behaviour. Williamson (1990) concurs by arguing that the theory's insistence on workably realistic, as opposed to analytically convenient, behavioural assumptions is a healthy approach. However, organisation theory starts from the premise that individuals and groups within an organisation are driven by management objectives whilst in the hospital sector management goals are defined by government and users of services. That might make prediction of organisational response to changes tenuous. Nonetheless, knowledge about institutional characteristics is inevitably important in explaining performance.

2.3 Costs and efficiency: theory and measurement

Economists define costs from a societal perspective as the value of resources used to produce a good or service (Creese and Parker 1994, Drummond et al., 1997). That means the cost of an intervention or activity includes direct cost of the intervention itself (fixed and variable costs[5]) plus other costs borne by participating agents (e.g. beneficiaries) such as access costs and loss of productivity. Direct costs are those costs specifically related to the activity under consideration and are usually financial costs—the accounting definition of costs (Kumaranayake 1998). Financial costs refer to the money spent on a specific activity. Such costs are supply side focused and exclude demand side costs. In economic costing attempts are made to ensure that costs reflect societal opportunity costs. If the market is imperfect and prices are distorted, shadow prices are computed to reflect the real input costs, non-tradable items are given shadow prices, exchange and discount rates are adjusted accordingly (Drummond et al., 1997).

Related to costs are two key economic concepts: technical and allocative efficiency. Technical efficiency is defined as the maximum amount of services produced from a given amount of resources or producing the same amount of services with fewer resources (Rosko and Broyles 1988, Farrar 1993). Allocative efficiency refers to the efficient allocation of inputs between outputs. In other words, putting resources to their

[4] "Behaviour can best be changed by rewarding approved behaviour rather than by punishing disapproved behaviour" (Perrow 1973).

[5] Fixed costs are costs that do not vary with output in the short term. Short term refers to the period within which fixed and semi-fixed inputs cannot be adjusted with output. Variable costs are those costs that vary with output. In the long term, all inputs are variable.

most rewarding use. A service is said to be economically efficient if no other input combination results in an increase in output without increasing costs.

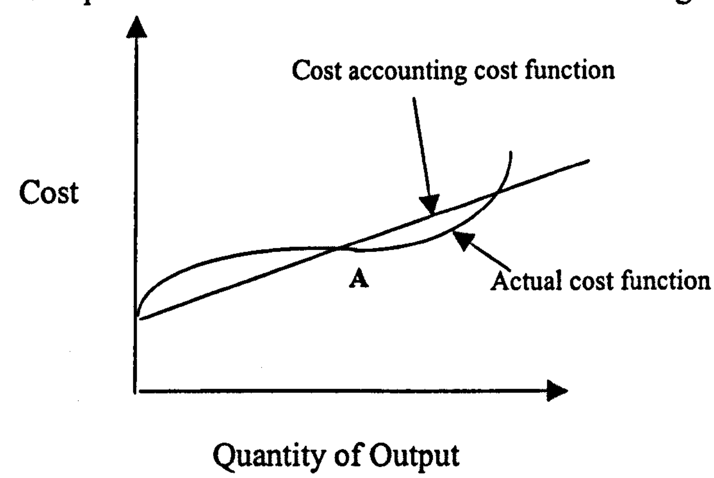
There are several ways of measuring supply side costs and efficiency. Before addressing alternative measurement methods it is apposite to define additional cost concepts: total costs, average costs and marginal costs. Total costs refer to fixed costs plus variable costs, and average cost is defined as total costs divided by total output. Marginal costs are defined as the cost of producing an extra unit of output. Measures of output are particularly important in health care because there are not readily available to measure. Ideal measures of health interventions are outcome indicators such as improvement in health status (Butler 1995)(discussed further in Chapter 5)

The relative cost levels of a hospital can be measured using two broad approaches: statistical (econometric) and cost accounting methods (Barnum and Kutzin 1993). Cost accounting methods can be applied to a few hospitals only because the methods are labour intensive and involve detailed examination of cost (or expenditure) records and workload statistics. Statistical methods require cost and activity data for large samples of institutions. Relatively less accurate data can be used provided the sample size is large enough to cater for the loss in measurement error by increasing sampling variation. It is possible using statistical methods to readily gain insights into marginal and average costs, and to explore the existence of economies of scale or scope[6] which accounting studies may not readily provide. Using different forms of cost functions (structural or behavioural) it is feasible to show the causal relationship between cost and its determinants (including input substitutability). Cost functions are built on the assumption of cost minimisation and homogeneity of outputs (Folland et al., 1997). With statistical methods differences in case-mix[7] and severity[8] can be incorporated through calculation of appropriate indices. Cost functions essentially capture the cost behaviour of a hospital. On the other hand, cost accounting methods generate point

[6] Economies of scale refer to a reduction in average cost due to increases in volume of output, and economies of scope refer to reduction in average costs due to an increasing range of outputs.
[7] Case mix refers to cases treated by a hospital classified on the basis of those criteria which are significant in explaining the differences in resource usage between the various cases treated

estimates because the assumed underlying cost function is linear (Figure 2). The function represents the sum of the products of the quantity of each input multiplied by its respective price. Accounting cost functions represent the cost of production, at one point, on a cost function (e.g. point A). This characteristic makes the cost function rigid because it cannot allow for technical responses to input price or quantities changes. Point A is the only point where actual and cost accounting methods converge if the hospital is minimising costs. With accounting methods, marginal costs are assumed to be constant, which is not always the case in practice. Econometric models can allow the foregoing assumption to be tested.

Figure 2 Comparison between statistical and cost accounting methods



Source: Barnum and Kutzin (1993).

Innovative but laborious ways of calculating marginal costs and assessing economies of scope and scale can be used with cost accounting methods (McPake 1992). For instance, marginal cost for a hospital output can be estimated from total variable costs recorded at different output levels (keeping other outputs constant). Similarly, economies of scale can be estimated by calculating average cost at different volumes of output. Calculating average inpatient costs based on the assumption that there are no outpatient services for instance, and comparing that with average inpatient costs when the assumption is relaxed might be insightful in assessing economies of scope. However, hospitals are multiproduct firms in which estimation of economies of scale or scope is a much more

[8] Case severity refers to the seriousness of the patient's clinical condition within a case type. Case severity can be measured by proxy variables such as age, secondary diagnoses as indicators of

complicated process than indicated above. For instance, economies of scale are estimated using "ray average costs": the average cost of an output bundle at some particular point along a ray. The behaviour of the ray average cost as outputs expand proportionately forms the basis of the definition of multiproduct scale economies (Butler 1995). With cost accounting methods, it is not possible when using cross-sectional data to know whether a hospital is operating in the short-run or long-run (Folland et al., 1997).

Abundant evidence exists on the application of statistical methods in assessing hospital costs and efficiency in industrialised countries (McGuire 1987, Valdmanis 1990, Scott and Parkin 1995, Hardley et al., 1996, Vitaliano and Toren 1993, Grannemann et al., 1986, Jensen and Morrisey 1986, Zuckerman et al., 1993). In LMICs large databases amenable to such statistical analysis are generally not available (Barnum and Kutzin 1993). A few such studies have been carried out in SSA (Wouters 1993, Bitran-Dicowsky 1993, Anderson 1980, Kumaranayake, 1998), which reported limitations linked to data quality and incompleteness. Cost accounting methods can easily be applied given the quality and inadequacy of available data, for estimating efficiency in developing countries (Mills 1990b, Lewis et al., 1996, Broomberg 1997, Hansen et al., 2000). It is also feasible using cost accounting methods to achieve high levels of cost disaggregation, for instance unit costs by ward or broad diagnostic group.

When measuring efficiency it is important to first define the product (or unit of output). This poses difficulties in a hospital because of its multi-product nature. Cost studies have thus tended to use intermediate measures of output like outpatient visits, admissions (or inpatient equivalents[9]) and patient days as units of analysis. The use of different output measures is also indicated by the need to avoid the possibility of making misleading interpretations of results associated with using one unit of analysis. The same is true if only average costs are calculated without consideration of marginal

comorbidity, or other severity of illness scores (Fleming 1990).

[9] Inpatient equivalents are an aggregate measure of inpatients and outpatient statistics converted into inpatients. This is usually done by a factor of 4 (Barnum and Kutzin 1993)'

costs[10]. Misleading interpretations may occur because of misunderstanding of the three cost components of inpatient services, which are overhead costs, hotel costs and treatment costs. Overhead costs refer to costs that remain constant regardless of level of production (e.g., lighting). Hotel costs are those costs associated with patient food and bedding which are generally constant with each patient day. Treatment costs are costs directly related to the patient (diagnostics, therapeutic and other services) and vary according to the type of disease. These cost components need to be understood at both hospital and patient level.

As alluded to earlier, misleading interpretations may occur if one unit of output is used in calculating average costs, and comparisons are made between hospitals. For instance, comparison of costs per inpatient day between hospitals requires an understanding of differences in patient lengths of stay. Hospitals with longer lengths of stay might exhibit low average costs. This does not necessarily mean they are efficient because such lower costs might be a reflection of inefficiencies associated with unnecessary hospital stay. Patient treatment costs are incurred most during the first few days of admission and fall as the patient is stabilised and initial diagnostic and other measures are completed (Barnum and Kutzin 1993). It is preferable to use cost per case because variation in length of stay is considered (Fleming 1990). Hospital service statistics used in tandem with unit costs enable a better appreciation of the efficiency implications of unit costs. Information on bed turnover rate, average length of stay and bed occupancy assists in the interpretation of unit costs and comparison between hospitals and between the same hospital over time. High occupancy rates, in cases of similar cost profile, lead to lower average cost per patient-day since overhead costs are spread over a larger number of used beds.

Hospital performance can be approached differently by just looking at hospital activity indicators (Pabon Lasso 1986, Mahapatra and Berman 1994, Broomberg 1997). Such assessment involves application of the Pabon Lasso graphical construct that summarises

[10] For instance, Hospital A might have a relatively higher average cost than Hospital B but lower marginal cost. Judging Hospital A on the basis of average cost might cause erroneous investment decisions, that is, investing in Hospital B instead of Hospital A.

bed occupancy rate (BOR[11]) and turnover rate (BTR[12]) given the Average length of stay (LOS[13]) (Pabon Lasso 1986). Mahapatra and Berman used the Pabon Lasso method to assess hospital performance in Andhra Pradesh (India), taking into account service mix and facility mix. The results obtained suggested that hospital activity indicators could reasonably identify under- and better performing hospitals. The method can be used to screen hospitals for detailed assessment.

2.4 Quality of services: theory and measurement

The quality of a product is just as important in health care as it is in any other sector or industry. Management of "health enterprises" requires knowledge about quality lest it becomes difficult to judge productivity or efficiency or make rational resource allocation decisions. Donabedian (1988) argues that "without it, recruitment, remuneration, and advancement could become arbitrary, prices idiosyncratic, and competition blind".

2.4.1 Definition of Quality

Quality is an elusive concept that can be used in many ways depending on the context (Donabedian 1980, Gilson 1995, De Geyndt 1995, Fleming 1990). The concept of quality has evolved over time as people grappled with its non-unitary nature and attempted to define it. There are many definitions of quality and only three are highlighted here to show the diversity of views on quality of care;

> **" Quality of care is the degree to which health services for individuals and populations increase the likelihood of desired outcomes and are consistent with current professional knowledge"(Institute of Medicine 1990).**
>
> **"Effective health care, that meets everyone's needs and that is delivered equitably, humanely and efficiently" (Black 1990)**
>
> **"A quality service means a service which gives people what they need, as well as what they want, and does so at lowest cost" (Ovretveit 1992)**

[11] BOR = (Number of admissions x LOS)/(365 x No. of Beds)
[12] BTR = Number of admissions/Number of Beds
[13] LOS = Number of Patient Days/Number of admissions.

Worth pointing out is that the last two definitions explicitly incorporate both provider and consumer perspectives and imply that quality is not a cost neutral term. These sample definitions serve to show that quality is multidimensional and can be perceived differently by those involved in health service transactions (i.e. providers, patients and consumers).

This study adopts the Institute of Medicine's (1990) definition as a comprehensive definition, which maintains a distinction between quality and cost, compatible with their separate treatment in this thesis. The term *health services* refer to a wide array of curative, preventive and rehabilitative services provided by different practitioners (public or private). The focus on the *individual* and *populations* depicts the different perspectives to be considered. The phrase *desired outcomes* refers to health outcomes that patients desire and highlights the crucial link between how care is provided and its effects on health. It also acknowledges the need to inform patients and their families about alternative interventions and anticipated outcomes, and includes patient and family satisfaction with health care services. The phrase "*increases the likelihood*" derives from the fact that quality is not identical to positive outcome. Good quality care may still result in poor outcome and patients may recover despite poor quality. Emphasis should then be put on both process and outcome of care. The need for quality care to keep abreast with advancement in knowledge and technology is couched in the phrase "*consistent with current professional knowledge*". Knowledge boundaries shift with time (Chassin et al., 1998). This definition permits a supply or demand side analysis of quality.

Quality can be conceived through the structure-process-outcome paradigm (Donabedian 1980)[14]. These elements of quality are in a chain linked to one another in a causal fashion. Each has meaning in the context of the others (Wyszewianski 1988, Chassin et al., 1987). The underlying assumption linking these aspects in a health intervention is that the particular medical technology under evaluation is efficacious. Efficacious[15] means that its use in medical care under optimal conditions achieves the most in patient outcome (Donabedian 1985, Bunker 1988, Wyszewianski 1988).

2.4.2 Methods of assessing quality of services

Measuring quality is no easier than defining it. The structural (input-based) approach to quality assessment is generally used because it is relatively simple (see Table 2 and Annex II). Its limitation is that "structure" depicts potential capacity to provide quality care, which may not necessarily be translated into quality services in practice. Structural attributes are important to system design but are limited as

---

[14] Table 2 Donabedian's structure-process-outcome paradigm (1980)

Structure

Structure assesses the quality of health care through a study of the settings in which the care takes place. This includes adequacy of facilities and equipment, administrative processes, qualifications of medical staff and organization. This assumes that given proper settings and instrumentalities, good medical care will tend to follow.

Process

Process considers not only that medical technology exists to achieve results, but also whether what is known to medical care has been applied: clinical history, physical examination, diagnostic tests, justification of diagnosis and therapy, technical competence, evidence of preventive management, coordination and continuity of care, acceptability of care to recipient. This assumes that given the proper procedures, good health outcome will tend to result.

Outcome

Outcome considers whether a change in a person's current and future health status can be attributed to antecedent health care. It examines recovery, restoration of function and survival. The validity of outcomes as a dimension of quality is seldom questioned. However, there are frequently multiple factors that affect health outcomes in addition to the treatment protocol, such that it is not always easy to attribute good health solely or even partly to good procedures.

Source: Adapted from Wouters (1991)

[15] There is generally confusion in understanding the difference between efficacy measurement and quality assessment studies. Quality-of-care studies ask the question: "Was the right thing done right?" Whereas studies on efficacy address the prior question, "Is this the right thing to do?" Studies of quality require that it be known, *a priori*, what intervention is efficacious for each given case. The two are different (Wyszewianski 1988).

instruments for quality assessment (Donabedian 1985). Use of both structural and process measurement is likely to produce a better view of the quality of services. However, for process to be a valid measure, it must be closely linked to the outcome that we care about (Chassin et al., 1987, Donabedian 1988). This is particularly difficult in a hospital situation given the multiplicity of processes that exist (disease and non-disease specific) which potentially affect overall quality of services.

Process assessment can be done retrospectively or prospectively and using explicit or implicit quality assessment criteria. Explicit criteria refer to criteria, which are set up by a panel of competent practitioners (experts) based on current clinical science knowledge and experience. Such criteria are based on expert consensus. Implicit criteria are individual sets of rules based on clinical science training and experience of a medical cadre. Medical decision making processes are not pre-specified but are based on experience and what is deemed medically correct at a given point in time, and for a given medical problem by the assessor (Donabedian 1982, Keeler 1992, Mitchell et al., 1997). Which method is used in practice depends on the context especially concerning availability, completeness and quality of data. In retrospective analysis, medical records are usually incomplete and lacking clinical variables necessary for process review (Donabedian 1985). In addition, it is infeasible to review all processes but to focus on specific key processes in the hospital production function—e.g. using the tracer method (Kessner et al., 1973). Two prospective approaches can be used. First, using a sample of hospitalised patients assessed on a given day based on medical records and where possible, direct examination supplemented by patient interviews. Second, a cohort of admitted patients could be studied by reviewing patients' needs at every stage of their treatment until they are discharged. If done unobtrusively patient specific data can generate valid insights into quality of services.

Outcomes are those changes, favourable or not in the actual or potential health status of persons, groups or communities that can be attributed to antecedent care (Donabedian 1985, Wray et al., 1995). One classic list of negative outcome measures comprises what Lohr (1988) called "the five Ds": death, disease, disability, discomfort, and dissatisfaction. Outcomes are not only difficult to measure but also difficult to interpret and attribute (Clearly and McNeil 1988, Donabedian 1980, 1988, Wouters 1991). This is because numerous factors, other than medical interventions affect outcomes, and it is difficult to attribute any particular factor to the outcome. Correct performance does not invariably produce successful outcome (Flood et al., 1982). The attribution problem is compounded by data problems. That is why outcome indicators used must be closely related to care provided, and subject to change if that care is altered. Without this relationship it is difficult to tell what must be improved, even if we know that the quality of services needs improvement. Where there are data problems, outcomes may be used as generic screens for identifying health facilities that require closer quality of care review (Williamson 1978a, Hayward et al., 1993). In practice the choice of which approach to use depends, *inter alia*, on causal validity, relevance to objectives of care, specificity, inclusivity, timeliness, availability of information, accuracy of measurement and cost (Donabedian 1988). Nevertheless, it is desirable that each of the approaches is considered where possible to enhance explanatory capacity.

There are few candidate methods for use in assessing quality of hospital services in a developing country context (Annex II). Gonnella and Govan's (1975) staging method emphasises the need to have homogenous groups (in terms of case mix and severity) and to note the condition of cases before admission or uptake into the system. The latter is valuable in the interpretation of medical processes and outcomes for defined medical interventions (Silder 1995). Use of homogenous groups considers case mix and case severity, differences, which are crucial for comparison purposes. A group could be a cohort of cases as in the 'trajectory method' (Brook and Stevenson 1970 quoted in Donabedian 1985), that is followed through the system noting all the landmarks in the treatment process. They could also be a selection of specific conditions or diseases from specific disease categories, that is 'tracers' (Kessner et al., 1973). With the use of tracers it is possible to make inferences for specific diseases or conditions without going through the difficult task of reviewing all cases. Williamson's (1978b) Health Accounting Method is valuable in systematising quality review processes. It relies on using pre-specified outcomes and any observed deviations from these predetermined outcomes (achievable benefits) prompts review of antecedent care, and of the system characteristics that influence the care. It consists of three steps. The first step includes selecting conditions for review based on the belief that care for these conditions may be deficient and adjustments to care are feasible and would produce significant benefits in health. Step two involves specification of outcomes and standards of performance to be achieved; and step three involves the actual assessment of outcomes by a health accountant. If pre-specified standards (expected benefits) are met antecedent care is not reviewed. Conversely, if standards are not met and deviations cannot be explained by chance, then antecedent care is reviewed for the entire group of cases selected for the study.

2.4.3 Empirical evidence on quality of services

There is abundant literature on quality of care from developed countries that has increasingly used outcome measures of quality (Fleming 1991, Morey et al., 1992, Keeler et al., 1992, Hayward et al., 1993, Carey and Burgess 1999). Improvements in information technology have allowed quality of services researchers to capture relevant data for outcome measures such as risk adjusted mortality rates, readmission rates, and complications (DesHarnais and Simpson 1992). In addition statistical methods that incorporate differences in case mix and severity between institutions have been used. Whilst some commentators (Chassin et al., 1998) argue that quality can now be precisely measured, others (Starfield 1998) argue that most of the work on quality assessment is disease-focussed and does not focus on "clinically relevant but nonclinical determinants" of health status and primary care.

On the contrary, the majority of quality-of-care studies in developing countries have been structural and process assessments (See Table A2.1). The preponderance of structural and process studies is more a reflection of practical considerations than conceptual ones. Firstly, health facilities in LMICs are relatively structurally deficient and therefore any such assessments are likely to be insightful. In extreme cases of structural deficiency even process assessments may not be justifiable.

Secondly, information systems are not robust enough to generate sufficient data that can be used for effective outcome analysis. Inevitably, important parameters for comparisons such as case mix and case severity are difficult to consider or construct because of data quality problems. The inclination has been to do such case studies at primary care level and less so in hospitals. The few studies that have been done at hospital level have also been structural with limited process review. Bitran (1995) and Broomberg (1997) are examples of recent studies in SSA that have attempted to include outcome assessments. However, the outcome measures were only disease-specific and based on limited tracer conditions.

2.5 Cost-quality tradeoffs: theoretical frameworks and measurement

Evaluating relative performance of hospitals requires knowledge about quality and cost tradeoffs. It is inadequate to judge performance on the basis of either cost or quality because of the inevitable need to explain one in the context of the other. For instance, it is futile to draw efficiency conclusions in service production without knowledge of quality. The general tendency has been to keep either quality or efficiency constant in the interpretation. The need to understand this link is more pronounced in resource-constrained environments (Hogan 1997). An understanding of cost-quality trade-offs requires a clear conceptual understanding of the relationship. The relationship is not obvious, and has often led to confusion in the interpretation of service quality and cost studies (Brooten 1997). The fundamental question to ask in exploring cost-quality relationships is "When does high cost mean high quality and when does it mean low efficiency?" There is no immediate and obvious answer to this question. Much depends on the service under examination and its context.

The tripartite classification of quality problems by Chassin et al., (1998) provides a basic framework for understanding cost-quality relationships. Quality problems might be classified as underuse, overuse and misuse of services. Underuse occurs when there is a failure to provide health care when it would have produced a favourable outcome for a patient (e.g. missed immunisation). Overuse occurs when a health service is provided under circumstances in which its potential for harm exceeds the possible benefit (e.g. prescribing an antibiotic for a viral infection). Misuse occurs when an appropriate service has been selected but a preventable complication occurs and the patient does not receive the full potential benefit of the service (e.g. avoidable surgical complications). Reducing overuse increases quality (by eliminating unnecessary risks to patients) and reduces costs. Addressing misuse increases quality (by reducing complications) and decreases costs (by eliminating treatments for complications). Solving underuse simultaneously affects costs and quality. If a health intervention is effective, its provision inevitably improves quality but at increased cost (with exceptions such as immunisations and prenatal care).

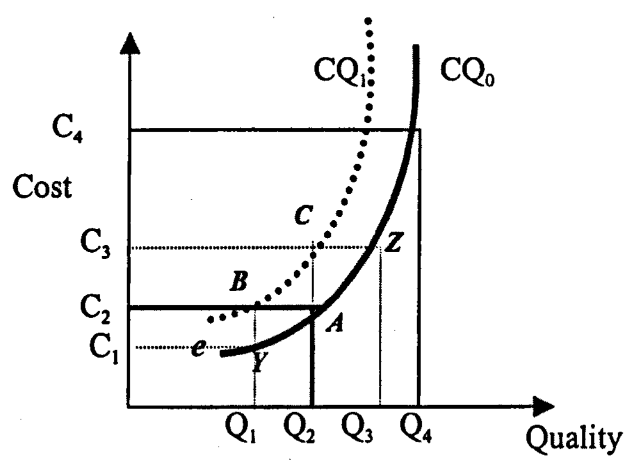
Theoretical frameworks have been developed to understand cost-quality relationships (see Schulz et al., 1983, Fleming 1990, Morey et al., 1992, Hogan 1997, Brooten 1997). The most notable one is the integrative model of Donabedian et al., (1982). According to this model, quality is defined as expected improvement in health status. The determinants of health status improvement are resources available to the physician, and the physician's choice of strategies of care. It assumes that ideal physicians only engage in activities that maximise health without wasting resources, and non-ideal physicians waste resources or even harm the patient if resources are used injudiciously. This implies that, with ideal physicians quality improvements are necessarily costly. In reality physicians are not "ideal" such that increases in costs may lower, increase or not change quality. It is possible to increase quality without increasing costs, for example through improvements in managerial practice (Fleming 1990). This model links with Chassin and colleagues' (1998) definition of quality problems in that, ideal physicians do not misuse, underuse or overuse services. Therefore, the direction of the relationship between costs and quality depends on the type of quality problem.

Empirical studies on cost and quality relationships are by no means conclusive. The relationship can be either positive or negative (Schulz et al 1983, Morey et al., 1992, Fleming 1990, Hogan 1997, Carey and Burgess 1999). This can be explained by several factors: first, use of different quality definition and measurement approaches; second, use of small sample sizes; third, different adjustments for case mix and case severity.

Fourth, limited inclusion of organisational variables in the analysis; and fifth, use of different databases that are not patient specific.

An alternative conceptual framework is described. The theoretical relationship between quality and costs can be explored graphically as shown in Figure 2.1. Quality (Q) is measured on the horizontal axis and is defined as a composite index of dimensions such as structure, process and outcome. On the vertical axis are costs (C). Costs of the norm (s) or expected quality are calculated using the ingredients approach (see Meng et al., 2000). The simplifying assumption is that services are provided efficiently, and that quality varies with costs.

Figure 2.1. Conceptual cost-quality relationships



Curve CQ_0 shows the relationship between costs and quality (the best practice curve). The curve traces all expected quality levels (norms) of a specific service that can be produced. Point ***e*** represents the point at which health services begin to be effective using current technology and medical science knowledge. Setting different quality standards would mean movement along the curve. Shifts in curves to the left of CQ_0, for example CQ_1, represents a deviation from the best practice curve that current technology allows and therefore inefficiency. At lower cost levels a small increase in cost (C_1 to C_2) results in a large increase in quality (Q_1 to Q_2). At higher cost levels, small quality increments require larger increments in cost, reflecting diminishing quality returns to cost increments. After a point (point C_4) further increases in costs result in no significant changes in the quality of services. Cost-quality trade-offs of a particular service can be examined using this framework. If, for example, the chosen 'norm' in the treatment of a hernia is at point Q_2, then the cost attached to it will be C_2 that is point *A* on the graph. The decision to set the norm at that level is a function of local circumstances (e.g., resource endowment and social preferences) and expected outcome which implies a judgement of allocative efficiency, or of where marginal rates of return (MRR) are equated across interventions. This depends on available alternative interventions and the opportunity cost of choosing one intervention against another. The MRR is higher at lower levels of funding. Therefore norms are appropriately specified at a lower point of CQ_0 when funding is more limited in the whole system.

If, in practice it is observed that the actual treatment costs of a hernia incurred by a provider is at point ***B***, service provision is deemed inefficient and the quality of care inferior than that expected (at point *A)*. A move from *A* to ***B*** depicts a change in quality with constant costs. A shift from point *A* to *Y* represents a lowering of standards and costs without reducing efficiency. If actual service provision is observed at point *C*, the quality of care remains acceptable, at Q_2, but costs become unnecessarily high as additional costs are incurred due to inefficiencies in service provision (provision of redundant and not harmful care). If additional services are harmful then the quality of care is negatively affected. Conversely, a movement from *A* to ***Z*** represents a more costly choice of the "norm". Additional costs incurred are attributable to the provision of extra care that adds to the likelihood of achieving the desired patient's outcome, not redundant care, but implies allocative inefficiency if point A truly equates marginal rates of return across interventions.

The framework provides a conceptual basis for examining costs and quality of defined hospital services, and their interpretation. The main caveat is that the relationship between cost and quality needs to be analysed within the context of prevailing economic and social realities in a locality or country. This means that the level of acceptable care should be realistic and achievable. Using the ingredients approach (Babson 1972, Drummond et al., 1997) it is possible to calculate expected costs of a quality defined service and compare them with the actual costs (Meng et al., 2000). It may be possible to simulate quality improvements and their cost implications with this model.

2.6 Summary and conclusions from the literature review

An analysis of hospital internal organisation and management seems to be a good starting point for understanding hospital behaviour. Organisational theory provides a strong basis for widening economists' understanding of hospital performance, however defined (Donabedian 1988, Wyszewianski 1988, Mitchell 1997, Carey and Burgers 1999). Its emphasis on understanding organisational characteristics permits us to explore the peculiarities of organisations, and assess how such characteristics may influence organisational performance. A few hospital performance studies that have attempted to capture organisational factors have demonstrated the importance of such factors and the need for further research (Becker et al., 1980, Sloan and Becker 1981, Schulz et al., 1983, Champagne et al., 1993). However, these studies used limited sets of organisational variables largely because of the quantitative approaches employed. For instance, important organisational variables such as staff motivation and its determinants are not considered. Qualitative approaches have the potential to allow more such variables to be included and explored in the analysis.

Relative costs and efficiency can be measured using two approaches: statistical and cost accounting. Of the two, cost accounting methods are more appropriate for a context such as Zimbabwe where the information technology and system in general is not robust enough to generate sufficiently disaggregated data across a large number of hospitals. There is no national database of hospital costs that can be subjected to statistical methods of analysis. By using cost accounting methods it is possible to explore costs at relatively high disaggregation levels (cost centres), and data permitting, economies of scope and scale. In addition these methods can be institutionalised, and be of regular use to hospital managers. This study employed a combination of cost accounting methods (step-down costing, resource use methods or ingredients approach) for assessing inpatient costs and exploring efficiency issues.

There is no universal definition of quality and neither is there a universal way of assessing it. The definition used must be relevant to the objective of the assessment and must consider the practicalities of its measurement. The majority of quality-of-care studies carried out in LMICs have used structural and process approaches, and few of these studies had hospitals as units of analysis. This is understandable given the difficulties of assessing quality of services in contexts of data scarcity. Furthermore, existing retrospective data is usually incomplete, inconsistent and inaccurate. Use of such data is fraught with problems. Montoya-Aguilar (1994) argues that use of available standards for quality performance assessment, particularly in developing countries, must be limited to those which are appropriate to their health services and correspond to the measurements of performance that they are able to carry out, without overburdening their information systems and diverting staff from their basic functions.

The study aims to contribute to the development of appropriate methods for measuring the quality of inpatient services through prospective strategies. Potential methods for reviewing inpatient quality of services are: "staging methods" (Gonnella and Govan 1975), the "tracer method" (Kessner et al., 1973) and Williamson's (1978a) "Health accounting method". Used in combination these methods can provide insights into the quality of inpatient services. This multiple approach plus use of explicit criteria seems suitable for complex organisations such as hospitals. Controlling for case mix and case severity is a major challenge. Some studies have used "tracers" to gain insights on case mix and case severity and for measuring outcomes (Broomberg 1997, Siriwanarangsun 1996, Gilson 1992). Use of hospitals at the same level of care combined with use of tracers may assist in accounting for case mix and severity differences. The main conclusion regarding quality assessment is that, measurement of structural and process aspects of quality of inpatient services is feasible in the Zimbabwean context, and relates well with the quality of care definition adopted for the study.

Cost-quality relationships pose conceptual and practical difficulties. Nevertheless understanding the relationship improves our understanding and interpretation of relative performance. The relationship may vary depending on the nature of service and its context, definitions of quality and its measurement, measurement of costs and organisational variables. It may be argued that the relevant question for investigation should not be whether or not quality is generally positively or negatively related to costs but what is the relationship between cost and quality and how does it help explain relative performance under a given context. This is supported by empirical evidence, which clearly shows no systematic pattern of the direction of cost-quality relationships (Fleming 1990). Furthermore, existing conceptual frameworks on cost and quality are either complex or too simplistic to be applied in practice. This study proposes a conceptual model of cost-quality tradeoffs, which can be used to explore the relationships with limited data.

CHAPTER 3 OBJECTIVES AND METHODS

3.0 Introduction

The purpose of this chapter is to present the aim and specific objectives of the study and a summary of the methods employed for each study component. The summary includes the rationale and appropriateness of the approach taken, target population, sampling procedures, data collection techniques and analysis. Detailed descriptions of the methods used are given in the succeeding result chapters. The chapter is organised in two sections. The first section provides the study aim, objectives, and hypotheses. The second section presents a general summary of the methods used in the study.

3.1 Study Objectives

3.1.1 The AIM of the research

The AIM of the research was to contribute to an understanding of the determinants of hospital performance.

3.1.2 General Objectives

1. To measure hospital performance.
2. To explore hospital quality-cost trade-offs.
3. To describe and assess hospital internal organisation and management.
4. To assess the relationship between (1), (2) and (3) above, and their implications for hospital reform in Zimbabwe.

3.1.3 Specific Objectives

1. To use cost accounting methods to measure inpatient costs at both hospital, and patient level in six public tertiary hospitals.
2. To determine appropriate methods for measuring quality of inpatient services, and to use them to measure quality of services in six public tertiary hospitals.

3. To explore hospital quality-cost trade-offs using tracer diseases: malaria and pulmonary tuberculosis.
4. To describe the internal organisation and management of public hospital services, and associated incentive structures.
5. To analyse how incentive structures, internal organisation and management relate to costs and quality of services.
6. In the light of specific research findings, draw policy implications for hospital reform in Zimbabwe.

3.2 Summary of Methods

3.2.1 Selection of Study Sites

The study was a comparative multi-case study and its general approach was both quantitative and qualitative in nature. There are seven public tertiary hospitals in Zimbabwe, and each covers an administrative province with an average of seven districts. The study was carried out at six of them—coded hospital 1-6 (see Chapter 4 for detailed descriptions of study setting). The seventh hospital, Chinhoyi was excluded from the study because of its atypical characteristics. Firstly, it was built in the early nineties, and is therefore fairly new compared to the others. Secondly, the hospital is as big as the national referral hospitals, and because of this has been experiencing problems of under-utilisation (small catchment population) and low staffing. Under the circumstances this hospital would have been an outlier in the study.

The hospitals were purposively selected to ensure comparability in terms of bed size, range of facilities, catchment population, and geographical coverage. The choice of hospitals at the same referral level was also an attempt to control for broad case mix differences (Tatchell 1983, Söderlund 1994). The official average bed size of the study hospitals was 200 beds with a range of 156 to 250 beds. In addition, the choice of provincial hospitals was influenced by the design of hospital reforms currently taking place in Zimbabwe. These reforms include *inter alia* giving hospitals greater autonomy, and this process was to start with central and provincial hospitals. By first looking at tertiary hospitals, the study results are better poised to have immediate relevance to the reform process. Although the study concentrates on provincial hospitals, the methods used are applicable to any other types of public hospital in Zimbabwe.

3.2.2 Data Collection Methods

3.2.2.1 Hospital Cost Analysis

The study focused on inpatient services only for three reasons. Firstly, inpatient services form the "core business" of referral hospitals. Secondly, an analysis of hospital inpatient services entails a comprehensive look at both actual medical and nursing care (clinical aspects), and all ancillary services. Lastly, other services can be incorporated once the core cost structure has been established. Costs were considered from the provider's perspective only. The analyses were carried out at three levels: hospital, ward and patient level.

(a) Hospital/Ward level: cost for hospital inpatient services per ward were measured using unidimensional ratio analysis methods—standard cost accounting methods. Intermediate measures of health outcome (patient days and admissions) were used as hospital products (Barnum and Kutzin 1993) (Chapter 6). To aid interpretation of cost analysis results, hospital service indicators (bed occupancy rate, average length of stay, bed turnover rate) were also analysed using the Pabon Lasso (1986) method (Chapter 4).

(b) Patient Level: Three tracer conditions (pulmonary tuberculosis, simple and severe malaria) were used to permit a closer analysis of inpatient care production functions (see Chapter 7). Tracers were selected by a panel of experts using two key criteria: (1) prevalence of disease, that is its contribution to hospital admissions and mortality, and (2) availability of generally agreed treatment guidelines. At each hospital, cohorts of prospectively recruited inpatients were used to determine average costs per patient using a combination of micro-costing or disease-specific costing (Drummond 1997), and top-down costing methods. Input consumption by patient from admission to discharge was recorded. Data collected included what was done to and for the patient, and excluded overhead and capital costs. Direct recurrent inputs captured included nursing time, doctor's time, laboratory tests, theatre, radiography, hotel services (bedding and food), drugs and other medical supplies. Average costs per case per diagnostic group were then calculated and resource use profiles per case established. The latter was done to assist in identifying how much of each resource input was used (Hutton 1997), and to permit an examination of cost-quality relationships (see Chapter 9).

3.2.2.2 Quality of hospital services

As for cost analysis, quality assessment was carried out using a triangulation of methods and at two levels: hospital and patient level (Chapter 8).

At hospital level: broad structural aspects of quality of services, that is staff, buildings and equipment, and availability of drugs were assessed. These measures show the hospital's capacity to supply services. An inventory of staff was carried out by ward, and buildings were assessed through observation and discussion with managers. Drug availability was assessed using a standard list of essential drugs drawn with the technical input of an experienced pharmacist. Available inputs (structure) were then compared with standard basic requirements for hospitals (norms or national guidelines) based on an essential hospital package and frequent patient needs.

At patient level prospective quality analysis methods using explicit criteria for the three tracers (simple and severe malaria, and pulmonary tuberculosis) were used: The reason for using tracers was to allow for a detailed review of various components of hospital services. The assessment was carried out using the same tracer cases used in the cost analysis. In order to systematise the process, Williamson's (1978a) health accounting method was adapted. The method is based on four stages: identification of tracers, setting of standards using local experts, application of standard criteria by a paramedic (health accountant), and review of results (actual versus expected). In this study, application of the criteria meant prospectively following-up cohorts of patients presenting with malaria and pulmonary tuberculosis from admission to discharge. The criteria included both structural and process aspects of quality of services. Its construction was based on current clinical knowledge (e.g. therapy and expected outcomes), resources available in the system and a consideration of other competing demands for those resources. The implicit assumption in criteria setting was that the best possible use of resources was chosen against competing demands on those resources (technical and allocative efficiency).

3.2.2.3 Qualitative research

Qualitative research was designed to address general objectives 3 and 4 because of the exploratory nature of their logic of enquiry (Chapter 10). A multi-site case study design was used, in which each of the six hospitals was the subject of inquiry. This approach allowed for detailed assessment and in-depth understanding of hospitals operations. It is argued that case studies permit development and testing of theories, which the study attempted to do. The purpose of this study component was to answer two questions: "What are the key internal organisational factors in the provision of public hospital services?" How do current organisational and management factors influence hospital performance? A triangulation of three methods was used to collect data: first, in-depth interviews with hospital executives, heads of departments and doctors/specialists using an interview guide; second, a review of policy documents; and third, attending meetings and observation.

In addition, an analysis of perceived effects of hospital reforms on existing hospital arrangements and performance was carried out. This was an ex ante analysis using two tracer reforms: hospital autonomy and contracting out of services as subjects of discussion. In the process the following general questions were investigated: "What are the motivations of different hospital players?" "What are their perceptions of the current internal hospital organisation and management, and performance?" and "What are the perceived likely effects of proposed reforms on current incentive structures, and consequently on hospital performance?"

3.2.3 Data Processing and Cleaning

Quantitative data on costs and quality was analysed using computer software packages Excel and SPSS. A system of linked Excel spreadsheets was used in the costing and sensitivity analysis. Data was checked for consistency using simple descriptive statistics, and tests for normality and outliers. This was followed by appropriate data trimming before final analysis. This explains different values of ***n*** in the analysis of specific variables.

Qualitative data was analysed using a modified "Framework approach"(Ritchie and Spencer 1994) because it permitted a systematic and repeatable data analysis process. The method is a deductive form of analysis and includes five stages: familiarisation, identifying a thematic framework, indexing, charting, and mapping and interpretation. Stage 1; 'familiarisation' involves randomly going through interview data to get a feel for what is available. Stage 2; 'thematic framework' involves identification of a thematic framework: The study had a loosely predefined thematic framework based on predefined subject domains. Therefore, this stage involved looking for emergent themes and discarding irrelevant original themes through content analysis. Stage 3; 'Charting' involved application of the thematic framework to individual interview data, and responses were tallied by theme (category). Stage 4; 'Mapping and interpretation' involved the sifting and sorting of data by core themes after which the data was analysed and interpreted with the guidance of the research questions and study hypotheses.

CHAPTER 4 COUNTRY PROFILE AND STUDY SETTINGS

4.0 Introduction

In this chapter a description of the country profile and the specific study settings is presented as a means of understanding the background and environmental factors that influenced directly or indirectly the study methodology and the results generated. Most arguments advanced and interpretations of study results are couched within the described context. Furthermore, an understanding of the context puts into perspective the pertinent issues and limitations encountered in the study. The chapter is divided into two sections. Section 4.1 presents the country profile and section 4.2 presents profiles of the regions in which the study hospitals are located.

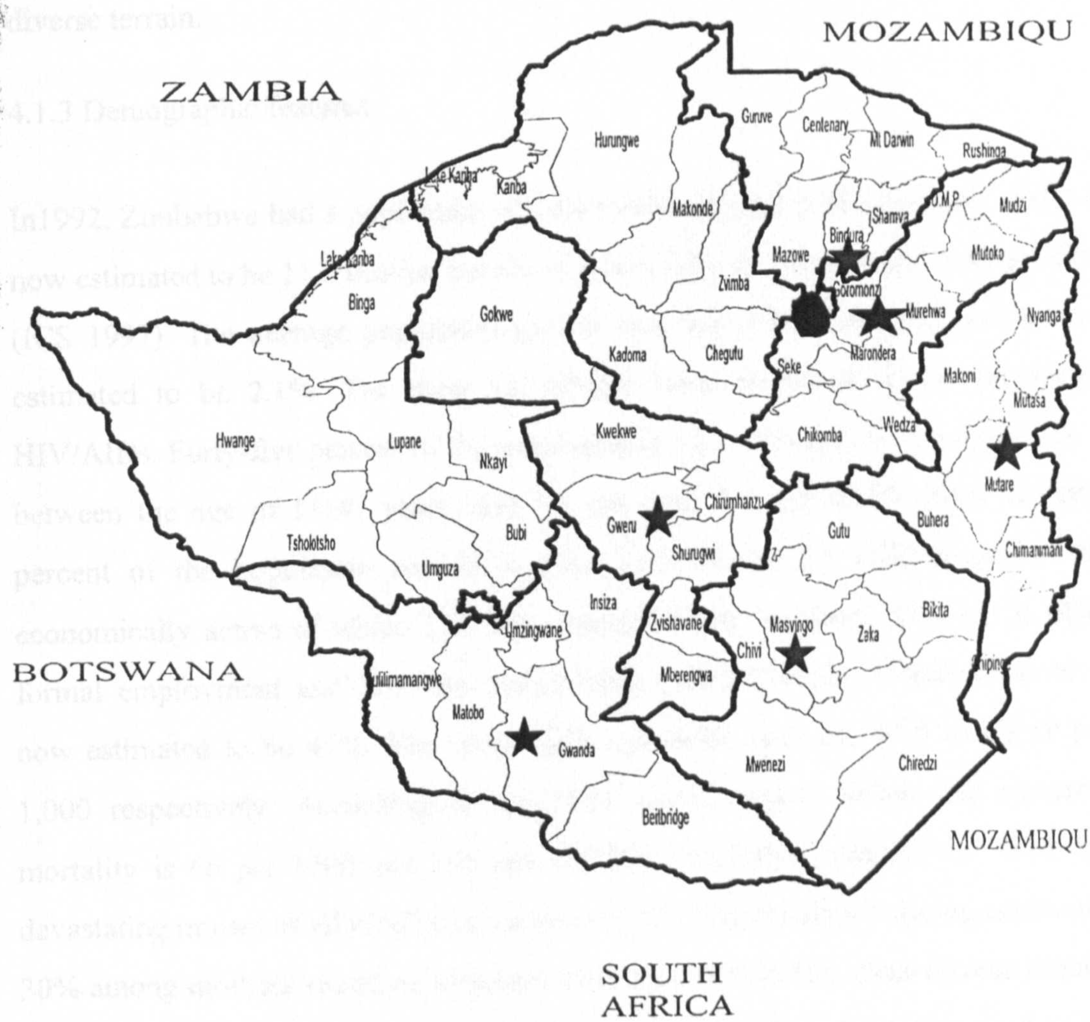
4.1 Country profile

4.1.1 Physical and administrative borders

Zimbabwe is situated in the southern part of the continent of Africa between latitude 15 30 and 22 30 South of the equator and between longitude 25 and 33 East of the Greenwich Meridian. It covers an area of 390 757 km^2. It is a landlocked country bordering South Africa in the South, Mozambique in the East, Zambia in the North, Botswana in the southwest, and Namibia in the East (Figure 4). The principal physical feature is the high plateau, the "high veld" that runs from Southwest to Northeast across the whole country. Land is divided into five natural regions according to soil type, rainfall and other climatic conditions.

The country is divided into ten administrative provinces: Mashonaland East, Mashonaland West, Mashonaland Central, Matebeleland South and Matebeleland North, Midlands, Manicaland, Masvingo, Harare (the capital city) and Bulawayo (the second largest city). Each province, in turn is divided into an average of seven administrative districts. The district is the basic unit of government in the country.

Figure 4 Map of Zimbabwe



Key: ★ study sites, ⬢ Harare-the capital city

4.1.2 Climate and rainfall

Zimbabwe has a tropical climate with four seasons in a year: summer (November to February), autumn (March to May), winter (June to August) and spring (September to October). The average rainfall is 843 mm per annum. Temperatures can be as low as 7°C in June and as high as 32°C in November. Droughts occur infrequently but usually with devastating effects on agriculture and the economy in general. The northern half of the country is less prone to drought and is considered the "bread basket" of the country with annual rainfall of 800-1,200 mm. The southern half is more prone to drought and experiences relatively low rainfall (400-800 mm) even in a normal season. The country is endowed with diverse places of scenic attraction such as the Victoria Falls (the second wonder of the world), a clear testimony to its diverse terrain.

4.1.3 Demographic features

In1992, Zimbabwe had a population of 10.4 million people (1992 Census), and it is now estimated to be 11.8 million people of which 52% are women and 48% are men (ICS 1997). The average population growth rate was 3.14% in 1992 and is now estimated to be 2.1%. The drop has largely been attributed to the impact of HIV/AIDs. Forty-five percent of the population is under the age of 15 years, 51% is between the age of 15-41 years, and 3% are over the age of 65 years. Seventy percent of the population resides in rural areas. Over 3.5 million people are economically active of which 23% are communal farm workers, 55% are in other formal employment and 22% are unemployed (1992 Census). Unemployment is now estimated to be 45%. The crude birth and death rates are 43.5 and 9.49 per 1,000 respectively. According to the 1992 census report, infant and maternal mortality is 66 per 1000 and 395 per 100,000 live births respectively. With the devastating impact of HIV/AIDs in the country, 20.3% prevalence among adults and 30% among mothers attending antenatal clinics (NACP 1998), these figures require major revision upwards. Total fertility rate was 5.91 in 1992, and it decreased to 4.3 by 1994 (ZDHS 1994). Life expectancy at birth was 61 in 1990 but again because of the AIDS pandemic; it is estimated to have been lowered to 41 years.

4.1.4 The Economy

Typical of LMICs, Zimbabwe's economy is driven mostly by agriculture and mining, manufacturing, and transport and distribution. These sectors contributed 12.9%, 8.2%, 26.4% and 19% to the Gross Domestic Product (GDP) of ZW$13 billion by 1990 (EIU, 1992). Zimbabwe is the second largest tobacco producer in the world after Brazil. Tobacco alone generates 40% of the countries foreign currency earnings. Principal exports by 1990 were tobacco (US$341m), gold (US$239m), ferro-alloys (US$155), nickel (US$101m) and cotton (US$86m).

During the period 1980 to 1987, the economy grew by an average of 3% (real GDP growth) due to a growing and vibrant productive sector after the war. In 1987, the country was able to generate US$1.5 billion in export earnings, enough for more than 12-months import cover. GDP per capita grew from about US$200 in 1980 to US$575 in 1987. Growth in the social sector, that is, health and education paralleled economic growth. Enrolment for primary education increased from 800,000 children in 1980 to 2.5 million in 1995. Secondary level enrolment increased from 66 000 pupils to 712 000 in the same period. By 1985, literacy and numeracy levels had increased to 80% and 90% respectively.

By late 1990, economic growth had taken a downturn, as world market prices for minerals and agricultural products plummeted, government borrowings in the domestic market increased thereby crowding out the private sector, and inflation reached an all-time high of 48.4% in 1992 (Bloch, 2000). The negative effects of a command economy, in a growing open global market began to be felt. In 1991, Zimbabwe implemented a five-year trade liberalisation and Structural Adjustment Programme (SAP) with the support of the World Bank (WB) and the International Monetary Fund (IMF). The concepts of free enterprise, open trading and cost recovery became acceptable. The programme was implemented against a backdrop of a high budget deficit of 10% and high domestic debt (WB, 1999), ill-prepared domestic producers, inefficient parastatals and excessive controls on imports and foreign currency, and an inward looking managerial culture.

The first five years saw a rapid increase in government foreign debt from 22.6% of GDP in 1995 to 60% by 1999 (RBZ, 1999). Domestic debt in 1999 amounted to ZW$68.2 billion (US$1.8 billion[16]). This led to company closures (mainly in the manufacturing industry) and job redundancies, flooding of the market by cheap, and sometimes low quality products, increase in budget deficit as government continued to financially support inefficient parastatals and its high defence spending, introduction of fees in education and strengthening cost recovery in health. The quality of life of the general public did not improve. Poverty increased, and it is

[16] 1US$=ZW$38 (articifially pegged).

estimated that 71% of communal households are very poor, 57% in resettlement and small-scale commercial areas, and 21% in urban areas (PASS, 1995). Inequity increased with an average Gini Coefficient of 56.83, ranked fifth in the world (UNDP 1988). The SAP programme was extended for another five years under a new name: Zimbabwe Programme for Economic and Social Transformation (ZIMPREST, 1996-2000), this time emphasising social safeguards against the negative effects of economic changes. By 1999, the country was experiencing its worst economic performance since 1980. The budget deficit was more than 11% of GDP, a staggering inflation rate of 70%, and an interest rate of 60%. The Zimbabwean dollar depreciated from ZW$10.8 in 1996 to ZW$38 to the US dollar in 1999 and interest payments to domestic debt reached 29% of total government expenditure. In addition, corruption became rampant, shortages of foreign currency became severe resulting in shortages of fuel and other imported inputs. Economic growth declined from 3.5% in 1996 to 0.5% by 1999. All this is attributable to poor macro-economic policies, and unsustainable foreign policies. Social sectors like health and education have not been spared from the negative effects of this economic morass.

4.1.5 The Health Sector

4.1.5.1 Health Policy

The Ministry of Health's policies in the 1980s were influenced by the "Growth with Equity" economic policy adopted by the Government of Zimbabwe to redress pre-independence imbalances. Accordingly, the MOH produced a policy document "Equity in Health" with equity as the core policy value. The main thrust of the policy was to improve access to services for the majority of the people. The Zimbabwe Health for All Action Plan (1986) was a translation of these overall goals into programmes and services. Deliberate emphasis was put in rural areas on rural infrastructural development, training of staff, deployment of more staff and establishment of the requisite managerial systems (MOH, 1999). Primary Health Care, was and still is, the driving force of the entire health care system. However, changes in the national and international socio-economic environment, and new health challenges such as HIV/AIDS have necessitated a re-examination of current policies and programmes. Concerns for quality, efficiency and equity dominate in most recent policy documents. In line with these changes the MOH has produced a National Health Strategy for Zimbabwe (1997-2007): working for quality and equity in health, to chart the way forward into the next decade. A key ingredient of this strategy is health sector reform.

4.1.5.2 Structure of the health sector.

The public sector plays a dominant role in the health sector, providing about 70% of health services. The private not-for-profit sector (Missions and NGOs) provides about 20% of services, 90% of which are in remote rural areas (Hongoro 1995). The rest could be attributed to the private for-profit sector in its various forms. The public sector has 11,594 beds (62%), missions 6,024 beds (32%) and the private sector 1,227 beds (7%)(MOH 1997). There is a rapidly growing private for-profit sector[17] mostly in urban areas where relatively more people can afford to pay for private services. By 1996, it was estimated that 75% of all registered doctors were involved in some form of private practice. Data on the exact size, distribution and growth of the private for-profit sector is not known because of lack of data from the private sector. This is compounded by lack of supportive legislative instruments or incentives to collect it (Hongoro and Kumaranayake forthcoming). A parallel traditional sector thrives largely in rural areas. In 1996, more than 45 000 traditional healers were registered with the national association—Zimbabwe National Traditional Healers Association (ZINATHA). The role of traditional healers in the health services delivery is acknowledged by an act of parliament, which makes ZINATHA a statutory body.

4.1.5.3 Organisation and management

The health delivery system conforms to the universal pyramidal structure built on the foundations of primary health care concepts. The health system has four tiers.

The first tier is the primary care level made up of clinics and rural health centres. There are more than 1,250 such units. These units represent the first port of call into the health system. The second tier is the secondary level made up of district hospitals (6,970 beds). Each district (57) has a district or designated district hospital (with +/-140 beds). District hospitals act as first referral centres, and are accordingly equipped and staffed to provide secondary care. The third tier is the tertiary (provincial) level made up of 8 hospitals (7 public and 1 mission) with a total of 2,487 beds. Tertiary hospitals are the third referral level from primary care facilities. Specialist and more intensive services are provided at this level, and each hospital supports an average of eight district hospitals in a province. Ideally, tertiary hospitals should have a specialist in each of the following specialties: gynaecology and obstetrics, ophthalmology, surgery, medicine, anaesthetics, paediatrics and psychiatry. Nurses, environmental health and rehabilitation technicians are trained at this level. The fourth tier is the quartenary or central level. There are six national referral centres, two of which are specialist psychiatric hospitals. Central hospitals form the pinnacle of the referral system (3,755 beds excluding psychiatry), and are involved in training of doctors, nurses and other paramedical personnel.

There is a parallel management hierarchy to the services referral system. Primary care facilities fall under the jurisdiction of the district, and are managed from that level although operationally they are managed by a nurse-in-charge in collaboration with a local clinic committee. At the district level, management is by a district health executive (DHE[18]) committee chaired by the district medical officer (DMO). This committee is responsible for the district hospital and district wide activities. At provincial level there is a provincial health executive (PHE[19]) chaired by the provincial medical director (PMD). This executive is responsible for the entire province, all the districts and the provincial hospital. However, tertiary hospitals are operationally managed by a hospital executive, chaired by a medical superintendent.

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[17] Includes general practitioners, group practices, corporate clinics, hospitals, laboratories, and nursing homes, traditional and faith healers, dental units, and others

[18] DHE consists of a district medical officer, nursing officer, pharmacist, environmental health officer and health services administrator and the hospital matron.

At central level the public sector is steered by various specialist departments headed by directors who fall under the authority of the Ministry of Health—the permanent secretary. One central hospital is semi-autonomous (Parirenyatwa) and is managed by a board of directors but others are managed by traditional hospital executives led by a medical superintendent. With current hospital reforms, some of these management structures will change. Private for-profit and not-for-profit facilities do not conform to this public organisational structure. The current strategic plan of the MOH advocates for organised partnership with the private sector such that the private sector effectively complements public services.

4.1.5.4 Disease profile

The country like many other developing countries faces a high disease burden compounded by the HIV/AIDS scourge. Communicable diseases are still the main causes of morbidity and mortality (Table 4). Malaria, pulmonary tuberculosis and HIV related conditions are in the top five causes of hospital mortality.

Table 4.0 Leading Causes of Hospital Mortality, 1996

National, 5 years and over		National, Total Ages	
Disease and conditions	Numbers	Disease and Conditions	Deaths
1. Pulmonary TB	2,948	1. Pulmonary TB	3,312
2. Malaria	2,527	2. Malaria	3,006
3. HIV/AIDS & other viral	1,575	3. ARI (lower tract)	2,524
4. Cardiovascular Diseases	1,081	4. HIV/AIDS & other viral	1,902
5. Intestinal infections	999	5. Intestinal infections	1,725
6. Extra-pulmonary TB	443	6. Perinatal conditions	1,223
7. Ill-defined conditions	439	7. Nutritional deficiencies	1,123
8. Diseases of the digestive system	415	8. CVD	1,081
9. Meningococcus & other meningitis	306	9. ARI (upper tract)	711
10. Anaemia	270	10. Ill-defined conditions	630
Total	15,066	Total	22,415

Source: MOH's National Strategic Plan (1999)

4.1.5.5 Health financing, trends and performance

There are three sources of government financing for the health sector: (1) taxes, or budgetary appropriations; (2) private insurance or medical aid societies (MAS); (3)

[19] PHE consists of the provincial medical director, pharmacist, nursing officer, environmental health officer, and health services administrator, and two medical officers of health responsible for MCH,

user fees or out-of-pocket payments. According to the latest study of health sector expenditure, the public sector accounts for 51% and the private sector for 49% (Schwartz and Zwizwai 1995: Table A4). As mentioned earlier, private for-profit sector financial data are not collected. As a result, little is known about private sector financing and performance. Conversely, private not-for profit data is captured through the public information system. At least 90% of Mission facilities' recurrent expenditure is drawn from the public sector (Hongoro 1995).

The public health financing outlook for the last 20 years is generally a declining one. The decade beginning 1980 saw the government investing considerable public resources in health, population, nutrition and education. The 1980-90 period saw a marked increase in real health expenditure. Spending as part of GDP grew from 2.0% in the early 1980s to 3% by the end of the decade. Ministry of Health expenditure as a share of total government spending increased and reached its peak of 6.2% in 1990/91. Impressive gains in the health sector ensued. For instance, infant mortality declined from 86 per 1 000 live births in 1982 (1982 Census) to 61 per 1 000 in 1990, life expectancy at birth increased from 55.7 in 1980 to 61 years in 1990, total fertility declined from 6.2 to 5.9 in the same period, the crude death rate declined from 10.8 in 1982 to 6.1 in 1987. Maternal mortality declined to 69 per 100 000 institutional live births by 1989.

However, the 1990s saw a reversal of many of these gains. The crude death rate increased from 9.49 in 1991 to 12.2 in 1997. Maternal mortality rose to 395 per 100 000 live births (1992 Census). The SAP which was introduced in 1991 emphasised, inter alia, cost recovery in health. In the first five years of SAP it proved difficult for the government to sustain the impressive health gains of the 1980s as the financial allocations to the social sector started declining. Real per capita expenditure in health declined by 37.8 % from Z$57.72 in 1990/91 to $Z35.86 in 1995/96. As a percentage of GDP, MOH spending fell from 3.1 in 1990/91 to 2.2 in 1995/6 while the share of total government expenditure fell from 6.2% to 4.2% (Kwaramba 1996). The situation was exacerbated by the increasing incidence of HIV/AIDS. By 1996 it was estimated that

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epidemiology and disease surveillance.

1.5 million people were HIV positive and 300 000 had AIDS. Current estimates are that one in ever 5 people is HIV infected, and about 700 people die every day (NACP 1998). Immunisation coverage reached a high of 80% in 1992, but fell to 73% by 1997 (MoHCW, 1997, 1982, National Census, 1992, MoHCW Nutrition Surveys 1982, 1984, 1985). Infant mortality increased from 66 per 1000 live births in 1990 to 80 per 1000 live births in 1997. It is against this backdrop that Zimbabwe embarked on an ambitious programme of health sector reforms.

4.2 Study setting: regional profiles

There are eight administrative regions in Zimbabwe but this section provides the background of six regions in which the study hospitals are located. The hospitals are coded Hospital 1 (171 beds), Hospital 2 (160 beds), Hospital 3 (250 beds), Hospital 4 (235 beds), Hospital 5 (223 beds) and Hospital 6 (156 beds)[20]. The regions in which the study hospitals are located share the same codes. Table 4.1 shows a comparative summary of the major characteristics of the regions. The regions have a similar number of administrative districts (7-8 districts each) which inform us about their size and similarity in organisation of the health services. The following section describes background features of the regions, which have a bearing on hospital performance.

4.2.2 Demographic characteristics

The size and distribution of the population is likely to influence utilisation of services. Table 4.1 shows variation in population sizes across the regions: region 5 has the largest population and region 6 has the smallest.

[20] Bed size numbers only include those that were used in the analysis, which are different from official bed numbers.

Table 4.1 Profiles of regional study settings: socio-economic & demographic factors, health facilities & statistics

Province/ Item	Mashonaland Central [1]	Mashonaland East [2]	Midlands [3]	Masvingo [4]	Manicaland [5]	Matebeleland South [6]
Admn. District.	7	7	8	7	7	7
Population:	867,318[1]	1,033,336[1]	1,302,214[1]	1,221,845[1]	1,537,676	591,747
Rural	92%	94%	77%	92%	89%	92%
Urban	8%	6%	23%	8%	11%	8%
CBR	37/1,000	33/1,000	35/1,000	33/1,000	35/1,000	35/1,000
Crude Death Rate	9/1,000	12/1,000	10/1,000	11/1,000	12/1,000	9/1,000
% natural increase	3%	2.34%	2.52%	2.22%	2.34%	2.58%
Literacy rate	67%	80%	82%	76%	75%	78%
Land size (km^2)	27, 284	32,727	-	44,310	34,870	66,390
Economic Base	Agriculture Mining	Agriculture	Agriculture Mining	Agriculture Mining	Agriculture	Agriculture Mining
HHD Income[3, 4]	ZW$11,912	ZW$11,629	ZW$18,259	ZW$10,389	ZW$10,170	ZW$9,644
Health Fac'ties:						
Tertiary hosp.	1	1	1	1	1	1
Tertiary beds	120	178	432	271	192	186
Sec. Hosp[7]	10	11	21	12	28	9
Second. Beds	850	1,123	2,660	2,056	1,164	1,007
Primary facil.	101	166	188	151	213	93
Staff:						
General Drs	30	32	27	49	44	32
Consultants	3	0	4	0	6	2
Nurses	779	1,065	723	1,177	1,233	692
Dentist	1	1	3	5	2	2
Lab.Tech'gist*	20	19	19	30	10	16
Pharmacists*	14	20	18	16	19	16
Radiographer*	11	15	13	14	17	12
Population based statistics.						
Malnutrition prevalence[5]	8.4%	7.2%	7%	4.7%	7.7%	10%
HIV prevalence	30% ANC mothers	25%	22% ANC mothers	28 % ANC mothers	45% of ANC mothers	40% of ANC mothers
Top 5 new Cases seen OPDs	ARI (23%) Malaria (20%) Injuries (6%) Skin dis. (5%) STDs (5%)	ARI (23%) Malaria (12%) Skin Dis. (7%) Injuries (6%) STDs (6%)	ARI (19%) Malaria (14%) STD (9%) Ill.defin. (8%) Skin dis. (6%)	ARI (26%) Ill. def.(12%) Skin d (11%) Injuries (6%) STD (6%)	ARI (21%) Malara (17%) Ill.def (11%) Skin dis (9%) Injuries (7%)	ARI (29%) Skin d (14%) Injuries (6%) Malaria (6%) STDs (6%)
Top 5 causes of hospital admi'ns (5 years +)	N. deliv. (30%) Malaria (17%) Intest. Inf. (8%) PTB (7%) Skin dis. (6%)	N.deliv. (24%) Injuries (11%) ARI (7%) TB (6%) Malaria (6%)	N.deliv. (30%) Malaria (10%) ARI (8%) PTB (7%) Injuries (6%)	N deliv(30%) Injuries (8%) Skin Ds (7%) Malaria (7%) PTB (6%)	Malara (25%) N.Del.(23%) Obstr'c(7%) TB (4%) Intest (3%)	N.deliv (30%) Malaria (7%) Injuries (7%) PTB (6%) ARI (6%)
Top five causes of hospital deaths (5 years +)	PTB (28%) Malaria (13%) Intest. Inf. (8%) ARI (8%) Oth'r viral (7%)	Cardio. (27%)[6] TB (13%) ARI (11%) Viral Inf.(9%) Malaria (5%)	PTB (25%) ARI (13%) Malaria (11%) Intest. Inf (9%) Digestive (6%)	Viral D (21%) PTB (18% Malaria (11%) ARI (9%) Intest. inf (6%)	Malar (28%) TB (14%) HIV (6%) ARI-LT (5%) P-circur (4%)	PTB (27%) Viral d(16%) ARI (11%) Intest.inf(10% Malaria (3%)

Notes: [1] 1992 census figures, [2] 1997 census figures, [3] Mean annual household income (in-kind and cash), [4] 1996 figure, [5] weight for age, [6] 1995 mortality figures, [7] Includes secondary and other referral hospitals. * includes technicians.

Population size, *per se*, is a major determinant of demand for hospital services, which means those population differences, may help explain hospital performance variations. Over 70% of the population in all regions is rural, and therefore access to tertiary hospital services may vary depending upon the way health services are organised and function at lower levels of care (including the referral system). Midlands has a particularly high urban population of 23% compared to an average of 8%. Urban populations tend to have greater chances of accessing tertiary care because of the urban location of tertiary services. An analysis of the population distribution by age groups and by region did not show any marked dissimilarities (CSO, 1992).

4.2.1 Geographical location

The distance of hospitals from major urban centres has implications for hospital input procurement systems and staffing levels. The markers in Figure 4 show the locations of the study hospitals. The hospitals are sited in regional cities/towns. Hospital 1 is located 80 km north of Harare, and hospital 2, is also 80 km from Harare but to the east. It would be expected that these two hospitals would have better staffing levels and input-supply systems because they are located close to the capital city. The government central medical store is located in Harare and has two regional stores in Masvingo (covering the south of the country) and Harare (covering the north of the country). Hospital 3 is located 275 km south of Harare in the third largest city in the country. Hospital 4 falls is 262 km south-east of the capital city. The hospital is located in a small town but one relatively bigger than the provincial towns of regions 1, 2 and 6. Hospital 5 is located about 263 km east of Harare in the fourth largest city in the country. As a border city, it has much more developed infrastructure compared to regions 1, 2, and 4. Study hospital 6 is located 600 km south-east of Harare but only 80 km east of Bulawayo—the second largest city in Zimbabwe. However, the regional town is the least developed in terms of physical and social infrastructure. All the hospitals except hospital 4 are located within or close to a major urban setting. Nonetheless, there is a regional government medical stores close to hospital 4. On the basis of geographical access and level of urbanisation, it would seem that that the potential for attracting staff, and having better access to essential inputs was not markedly different.

The structure of regional population pyramids is broad-based with a high proportion of people aged 0-20 years. This might be loosely interpreted to mean that age-specific morbidity patterns were likely to be similar. The crude birth rate, crude death rate and the percentage of natural increase in population were also similar across regions. It could then be argued that the key demographic features to hospital performance were likely to be population size, and its distribution between rural and urban areas.

4.2.3 Socio-economic characteristics

Socio-economic factors such as household income and people's level of education have an influence on utilisation of hospital services. Educated people, although least likely to be ill, are more likely to use health services than less educated ones. The literacy rate was similar across the regions with a mean of 76% (67-82%). Despite the fact that the majority of the population is rural-based and therefore likely to be exempted from paying hospital fees, other access costs such as transport and drug costs are equally important in influencing service utilisation patterns. Households with higher income are more likely to use tertiary health services even if it means bypassing the referral system. The economy of the country is largely based on agriculture (and mining in some regions). Estimates of annual household income in 1996 were similar (Z$10,000-12,000) except for Region 3, which had a notably high annual income of ZW$18,259. This could be attributed to its relatively developed mining and processing industrial sector. However, these figures do not show the distribution of household income between rural and urban areas. Disaggregated information might have shown potential differential access to health services in the regions. Urban populations tend to have more annual household cash income, which increases their potential to access hospital services. By policy, the referral system is supposed to ensure equal access through exemptions and preferential treatment for those who comply with it but in practice the system does not work as expected.

4.2.4 Morbidity and mortality patterns

Differences in demand patterns for hospital services may be explained by differences in disease patterns (burden of disease) found in the regions. The disease pattern determines the hospital's case mix and hence contributes to its resource consumption pattern. Normal deliveries[21] contributed the highest but similar proportion of hospital admissions (30%) in all the regions except in Region 5 where malaria (25%) was the major cause (Table 4.1). Malaria only contributed 6-7% of hospital admissions in regions 2, 4 and 6. This might be a reflection of regional differences in malaria prevalence or capacity of primary care facilities and preventive programs to contain and prevent malaria. Pulmonary tuberculosis (PTB) contributed an average of 6% of hospital admissions (range of 4-6%) across the regions. In sum, the pattern of the top five causes of hospital admissions varied slightly across regions. HIV/AIDS, which is a major cause of morbidity and mortality in the country, is high in all the regions although Region 5 and and Region 6 have higher prevalence rates of over 40%.

Hospital mortality patterns serve to show the importance of particular diseases to the workings of hospitals. A similar profile of communicable diseases as the major causes of hospital mortality is observed across the regions: PTB, malaria, ARI, cardio-vascular, intestinal, digestive and viral infections. Malaria and PTB stand out as major contributors of inpatient care although malaria deaths are less in regions 2 and 6.

4.2.5 Health facilities

The capacity of regional health services to cope with the demand for services (disease burden) varies and is likely to explain variation in hospital performance. Capacity can be narrowly defined in terms of availability of beds and staff as shown in table 4.1. Official bed statistics show that Region 3 and Region 4 had the highest number of tertiary beds (432 and 271 respectively) and secondary beds (2,660 and 2,056 respectively) compared to the other regions. This translates to high numbers of beds per capita, which shows that these regions had relatively better capacity to meet the demand for inpatient services.

Capacity as measured by number of staff shows that the regions 4 and 5 had superior staffing levels: for instance doctors (49 and 44) and nurses (1,177 and 1,233). Specialist

[21] Normal deliveries not considered as a disease in true sense.

consultants play an important role in the provision of tertiary care. Table 4.1 shows that regions 1, 2, 4 and 6 are severely constrained. The level of specialist care expected of tertiary hospitals is likely to be undermined. There is less variation in the numbers of other professional groups. Observed variation in the quantity and quality of staff in the regions is likely to impact on the performance of hospitals (explored in detail in Chapter 8). It is worth noting that there are other aspects of hospital capacity (plant size) such as equipment and buildings, which are important to consider when interpreting performance

[22] 1US$=ZW$38 (articifially pegged).
[23] Includes general practitioners, group practices, corporate clinics, hospitals, laboratories, and nursing homes, traditional and faith healers, dental units, and others
[24] DHE consists of a district medical officer, nursing officer, pharmacist, environmental health officer and health services administrator and the hospital matron.
[25] PHE consists of the provincial medical director, pharmacist, nursing officer, environmental health officer, and health services administrator, and two medical officers of health responsible for MCH, epidemiology and disease surveillance.
[26] Bed size numbers only include those that were used in the analysis, which are different from official bed numbers.
[27] 1US$ = ZW$8.00 in 1995/86 FY

CHAPTER 5 ANALYSIS AND INTERPRETATION OF HOSPITAL ACTIVITY STATISTICS: WHAT CAN WE LEARN?

5.0 Introduction

The definition of output for the hospital sector is difficult, as for any other services because outputs are intangible (Butler 1995, McGuire 1985, Donaldson and Magnussen 1992). Characterisation of the hospital market by input or output is equally difficult. There is much heterogeneity in the sector, short stay hospitals (acute hospitals), long stay hospitals (psychiatric and chronic or infectious diseases hospitals), and other specialised hospitals. In order to understand hospital productivity, basic questions need to be answered: What is a hospital? What does it produce? How is hospital output measured? What factors influence its productivity and behaviour?

This chapter addresses four specific objectives. First, to define and discuss hospital output, its relevance and the controversies surrounding its interpretation. Second, to look at the effects of supply and demand side factors on hospital activity statistics. Third, to review the Pabon Lasso (1986) method of evaluating hospital performance, and apply it to the six study hospitals. Fourth, to discuss the results with particular emphasis on the implications for costs and relative efficiency of the study hospitals.

5.1 What is a hospital?

This seems to be a very simplistic question but its answer may be elusive. An understanding of what a hospital is allows for clarity in defining its outputs. A hospital is defined as "an institution providing medical and surgical treatment and nursing care for all ill and injured people" (The Concise Oxford Dictionary Ninth Edition). By definition, the principal function of a hospital is providing inpatient services—hospitalisation of patients. In this study, the hospitals are acute hospitals though they provide minimal specialised services such as psychiatric services. They all have a regional teaching function for nurses and environmental health technicians.

Hospital service mix (scope and scale of services) depends upon the national referral hierarchy and the country's hospital policy. The majority of hospitals in LMICs have substantive outpatient departments (Van Lerberghe et al 1997, Mills 1990b).

5.2 Hospital Output: conceptual issues

A hospital is a complex organisation characterised by a myriad of inputs, processes and outputs. There are four broad categories of hospital output: inpatient treatments, outpatient treatment, teaching and research (Butler 1995). In some instances, hospitals provide preventive services and supportive functions to primary health care services (Lee and Hoare 1989). This diversity of services raises conceptual problems in the definition of hospital output.

Rice (1966) argued that a hospital could be viewed as two firms in one. One firm producing medically necessary treatments which are intermediate outputs, and the other producing amenity services which are seen as a class of final outputs which can respond to market signals. The risk of negative utility or undesired outcome from consumption of amenity services is absent. Unlike amenity services, medically linked outputs are difficult to define and interpret, and the risk of an undesired outcome exists. In other words, consumption of medical services does not necessarily lead to the desired outcome. Amenity services can be provided by other organisations outside the hospital and can therefore be conceptually excluded in attempts to define hospital output. It may be argued that medically linked treatments are the essential part of hospital activities, which require consideration in the hospital output definition debate.

The major theoretical question that arises is whether hospital output can be defined in terms of medical treatment itself or its effect on the health status of the patient. Some commentators have taken a sympathetic view of the latter perspective based on the argument that the ultimate objective of any health services is to improve health status (Tatchell 1983, Torrance 1986, Söderlund 1994). It would seem that the argument that the expected output of a hospital is a positive increment in patient health status is conceptually plausible. However, health status improvement is not only a function of hospital care but also many other factors. Such factors include patient compliance with treatment, social environment (housing and hygiene and nutrition), patient biological and genetic constitution. Hospitals do not produce health but their services are an essential input to improving health status. Because of the existence of confounding variables, empirical measurement of the additive effect of hospital services to patient health status improvement is a daunting task (an attribution problem). Furthermore, there is no consensus on the measurement of health status itself. A number of concepts have been used (e.g. QALYs, EUROQol, Life years gained, DALYs) and each has its advantages and disadvantages (Dolan and Gudex 1995, Torrance 1986, Drummond et al., 1997).

Butler (1995) suggests an alternative approach. He suggests that hospital output be defined in terms of the treatment provided rather than the resulting change in the health status of the patient. With this definition, measurement of hospital output would focus on the degree to which hospitals provide the necessary inputs that can be expected to lead to the desired health outcome. This definition has some practical appeal because treatment inputs are measurable and it is compatible with a supply-side focus. Besides, this treatment definition eschews the practical difficulties of assessing patient health status improvement.

5.3 Patient Days and Admissions or Cases

Hospital cost studies have generally used patient days and admissions or treated cases[28] as measures of hospital output (Tatchell 1983, Barnum and Kutzin 1993, Lewis 1996, Broomberg 1997). The underlying logic of using these two measures of output is not free from controversy. More often than not, the definition and understanding of the two measures of output has brought confusion and contradictions in the interpretation of hospital cost analysis results. A clarification of these terms from the outset is important in setting out this empirical work.

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[28] Treated case or admission is defined as one episode of hospitalisation. Note that this is different from an episode of illness, which might have more than one hospitalisation.

The confusion arises from the difficulty of empirically separating inputs and outputs under these circumstances. A hospital bed-day can be viewed as an input to an admitted case, and in turn a treated case as an input to improving individual or community health status. In this case both patient days and treated cases are not end results themselves. I use both measures in the study based on feasibility, and potential utility of results at various levels of hospital management. The notion that a treated case (episode of hospitalisation) is a better unit of measurement of hospital output (Butler 1995) is inconsequential because both admissions and patient days are not in themselves hospital outputs. The quality of admissions themselves is important because an inappropriate admission is not a good measure of hospital output. Diagnostic related groups [DRGs] (see Tatchell 1983, Söderlund 1994, Donaldson and Magnussen 1992, Rhodes et al 1997), Health-care resource groups (HRGs) and finished consultant episodes (FCE) (Clark and McKee 1992, McKee and James 1997) are other improved measures of hospital output. They offer opportunities for a tighter definition of hospital outputs but also have disadvantages. DRGs, for example maintain the notion that health care outputs are measured in terms of the number of patients treated. DRGs are not entirely homogenous groups (Donaldson and Magnussen 1992). The study employs patient days and admissions as units of hospital activity that can enable an analysis of the relationship between hospital activities and costs. In addition, a detailed analysis of each hospital is carried out as a strategy to acquiring insights into the underlying output levels and patterns. The following reviews supply and demand side factors that influence these indicators in order to aid the interpretation of performance.

5.4 Effects of Supply-side Factors on Hospital Activity Statistics

The effect of supply-side factors on hospital activity is underpinned by the way hospitals behave. The hospital's objective function dictates its supply-side policies and activities. However, a convincing hospital behavioural model is yet to be specified (McGuire 1985). This is due to the difficulties associated in defining output, heterogeneity of hospitals, lack of readily identifiable pricing mechanisms, and the fact that the sector is not exclusively driven by profit but also by a wide range of social goals. The hospital objective function can be viewed from two perspectives: the medical or economic perspective. From the medical perspective, hospitals aim to provide quality services that current medical science knowledge permits (clinical excellence). Clinicians and clinical practice are dominant factors. Under such circumstances patients may be over serviced (battery of diagnostic tests, polypharmacy, unnecessary stay and use of sophisticated technology). Over servicing of patients may occur because of the desire by clinicians to increase the likelihood of effectiveness of the intervention. The economic view is that hospitals maximise the objective function of hospital decision-makers. This might imply maximising hospital output within a budget and quality constraint or maximising hospital revenue, for example. In contrast to the medical approach, hospital administrators or managers may strive to minimise resource use in order to maximise revenue, or increase output. Contemporary wisdom suggests that the economic model is gaining prominence over the traditional medical approach. The dynamic context within which hospitals are operating now, both in developed and LMICs, requires some form of economic adaptation. The effect of these behavioural factors on hospital utilisation is important in interpreting hospital service performance indicators (McGuire 1985, Hornbrook and Goldfarb 1983, Farrar 1993, Bartlet and Le Grand 1994).

Two measures of hospital activity have been discussed so far—patient days and admissions. The other service indicators are bed occupancy rate (BOR), bed turnover rate (BTR), and length of stay (LOS). The bed occupancy rate is a measure of the proportion of beds occupied to the total available (or potential) bed days, calculated on an annual basis. Bed turnover rate measures the annual number of cases or admissions per bed. The length of stay is a measure of the annual average patient stay in hospital from admission to discharge in days. These measures, to some extent, are a reflection of hospital organisation and management policies because management can influence hospital utilisation in these and other respects.

Availability of hospital excess capacity (or excess beds) may influence hospital admissions in which case supply induces demand (Smith 1972). Where there is excess capacity, doctors' inclinations to admit cases even for diagnosis and elective surgery may increase. Patients may unnecessarily be kept longer in hospital (delayed discharges) in order to reduce service intensity per patient per day as a health worker strategy to reduce workload. The result is that the number of patient days is inflated unnecessarily. Average costs per day computed using such inflated patient day figures create false impressions of efficiency.

High bed occupancy rate can be due to shortages of essential inputs, for example doctors and laboratory technologists. This phenomenon is not uncommon in LMICs. Patients are admitted for days waiting for a doctor, or waiting for results of tests referred to a higher level hospital. Some cases are referred to higher level hospitals for diagnostic tests that could be done locally. All these inefficiencies can reduce the cost per patient day.

Hospital admission and discharge policies can influence hospital activity measures. Some hospitals discharge patients on specific days of the week and often delaying patient discharge. Anecdotal evidence in Zimbabwe suggests that patients who visit a hospital at night have a greater chance of admission than those who visit during the day. This is because a doctor is usually not available to make the decision not to admit or the patient comes from far, and there is no night transport.

Hospital reimbursement mechanisms can also influence the design of hospital admission and discharge policies. In Zimbabwe, hospitals generate some revenue through user fees. Those who earn less than ZW$400 (US$40) are exempted (MOH 1996). The government pays for the indigent through a Social Dimension Fund (SDF). Hospitals claim for reimbursements from this fund for government-responsibility-patients. In practice this system does not work smoothly. In 1996, hospitals were allowed by central government to retain fee revenue (through a Hospital Fund) for local use. This policy's objective was to create incentives for hospitals to collect more user fees and improve the quality of services. Two theoretical scenarios may be occurring concerning supply side effects on hospitalisation. One is that, paying patients are readily being admitted in hospital and discharged late (high admission rate, bed occupancy, and length of stay) to increase revenue. The other scenario is that higher admission thresholds are applied to non-paying patients who are likely to be discharged early (low admission rate, bed occupancy and length of stay) to minimise costs. Whether or not this is happening is an empirical question, which this study did not address. The supply side discussion is summarised in Box 1.

Box 1 Effect of Supply-Side Factors on Hospital Activity Statistics

Factor	Bed Days	Admissions	Remarks
• Clinical Practice	↑↓	↑↓	Function of incentive regime
• Hospital Policies	↑↓	↑↓	Function of incentive regime
• Excess Capacity	↑	↑	Supply induced demand
• Availability of Inputs	↑↓	↓	Poor Quality of Care
• Reimbursement method	↑↓	↑↓	Function of type of payment

5.5 Effects of Demand-side factors on Hospital Activity Statistics

Demand for hospital beds can be crudely estimated by the number of used beds per population (bed use per capita) per given time period. In cases where there is low bed capacity but greater demand, higher bed occupancies, bed turnover rates and shorter lengths of stay are expected. Hospital management is likely to respond to high demand by minimising unnecessary admission and delayed discharge. This either increases revenue and/or access to hospital services. The question is whether these high rates reflect better performance or are simply problems related to the size of the hospital (defined here in terms of beds). In comparing performance across hospitals it is necessary to look at the size of the hospital versus its potential and/or actual demand (utilisation data). The demand for hospital beds is uncertain (Pauly and Wilson 1986), and it is difficult to find an optimal bed size for a given population. However, hospitals are expected to achieve bed occupancy rates that consider the need to leave 5-15% of beds available for disinfection, bed repair, and emergencies (Pabon Lasso 1986). Luce et al (1996) note that 80% utilisation of capacity in hospitals is the norm. A smaller hospital will show high bed turnover rate for the same level of utilisation than a bigger one. Absolute utilisation statistics are useful under such circumstances.

Low hospital demand can be a product of poor perceived quality of services due to some observable structural factors such as shortage of doctors, nurses and drugs. Potential demand is not tapped leading to problems of under-utilisation. Poor quality of services is a sign of inefficiency, and some empirical evidence from LIMCs suggests that improvement in quality of service can lead to efficiency improvements (Bitran 1995).

The existence of alternative hospital services within the same catchment population of the target hospital impacts on the level and pattern of demand for its services. Competition in terms of price and/ or quality affects hospital output considerably. However, in the Zimbabwean context provincial hospitals are regional monopolies and competition is not a major factor in explaining bed use. A summary of this discussion is shown in Box 2.

Box 2 Effect of Demand-Side Factors on Hospital Activity Statistics

Factor	Bed Days	Admissions	Remarks
• Disease Burden	↑↓	↑↓	• Morbidity levels influence demand level and hence activity statistics
• Perceived Quality of services	↑↓	↓	• High-perceived quality is associated with high demand and the obverse is true.
• Competition	↑↓	↑↓	• Function of the nature of competition
• Price of services	↑↓	↑↓	• Function of price level and payment system

5.6 Pabon Lasso Method: rationale, strengths and weaknesses

Work by Pabon Lasso (1986) on the evaluation of hospital performance in Colombia has been inspirational to many interested in understanding and measuring performance of hospitals in LMICs. The rationale of his work was centred on the need for simultaneous analysis of several indicators of hospital performance. Analysis of individual indicators of hospital use has often led to confusion and contradictions. The strategy provides a holistic view of hospital performance. Pabon Lasso used a graphical presentation in which bed occupancy rate (BOR) is shown on the X-axis and the bed turnover rate (BTR) is on the Y-axis. The average length of stay is a ray from the origin by virtue of the mathematical relationship between BOR and BTR—LOS is equal to 365 x BOR/BTR. The LOS increases as the ray moves from the origin clockwise. The graph is divided into four sectors using the average BOR and BTR. Each sector has specific characteristics: Sector 1 (lower left) indicates relatively low levels of bed occupancy and bed turnover rate—suggestive of inefficiency; Sector 2 (upper left) indicates relatively low levels of bed occupancy, high bed turnover rate, and short hospital stays; Sector 3 (upper right) indicates relatively high levels of bed occupancy and bed turnover rate—suggestive of greater efficiency (but capable of alternative explanation); and Sector 4 (lower right) indicates relatively high levels of bed occupancy, low bed turnover rate, and long hospital stays [typical of hospitals specialising in chronic diseases] (Figure 5).

Confidence intervals for the mean BOR, BTR and LOS are calculated using a given significance level (e.g. 5%) and charted on the graph. The intersection of these lines defines a rectangle signifying the "expected average/normal practice" of all the hospitals under review. Hospitals that fall within this area are considered normal performers and those that do not as outliers. Outliers can either be good or bad performers depending on their sector location on the graph.

This method is amenable to application in the Zimbabwean context because it is simple, and available data can be used to make such analysis. Most importantly, the method can easily be institutionalised for use by hospital administrators and managers at regional and national levels. Currently in Zimbabwe, district, regional and national managers do not have a ready method for identifying non-performers in a systematic way. Poor performance is only identified when there is a disaster or crisis in a particular hospital.

The specificity and sensitivity[29] of the method in identifying outliers can be manipulated by changing levels of significance (the probability that the observed scenario is by

[29] Specificity in this case implies the ability of the method to detect true outliers. Increasing the significance level, for example to 1%, reduces the element of chance in identifying outliers (reduces the number of false positives). Sensitivity implies the ability of the method to capture all outliers. A high significance level increases chances of capturing all outliers (high sensitivity). Sensitivity can be increased by increasing the confidence level, and specificity can be increased by reducing it.

chance). Hospital managers have the discretion of choosing the levels of stringency in judging hospitals in their context. The method is useful in screening hospitals and identifying those that require attention but it does not tell us anything about the underlying circumstances (e.g. utilisation patterns and quality of care, etc.) of observed scenarios. The other limitation is that the expected level of performance is defined using the general performance of all the hospitals under review. This means that the yardstick for performance assessment is an "average." It is possible to have an entire sector of poorly performing hospitals, and use of the "average" might create false impressions about hospital performance. Nevertheless, the utility of the method is maximised if it is employed as a systematic screening mechanism and nothing more. In this study, the method is used as a first step to characterising the study hospitals. The results obtained are useful in the interpretation of hospital cost analysis results. The main disadvantage is the relationship of any of the three measures to output as discussed in the last section.

5.7 Application of Pabon Lasso Method to Study Hospitals

The bed size for the study hospitals ranged from 156-250 beds, and their performance profile is shown in Table 5. There are no marked differences in bed size to warrant suspicion about possible differences in utilisation due to differences in bed size. The hospital performance indicators[30] for each hospital were plotted on Pabon Lasso's graph, and the results are illuminating (Figure 5). What is interesting is that the hospitals are quite diverse (spread on the graph) in their performance.

[30] Confidence Intervals were calculated at 5% Significance Level: BOR (mean = 84.8, CI = 76.6-93.1), BTR (mean = 60, CI = 45.8-74.6) and LOS (mean = 5.3, CI = 4.2-6.3).

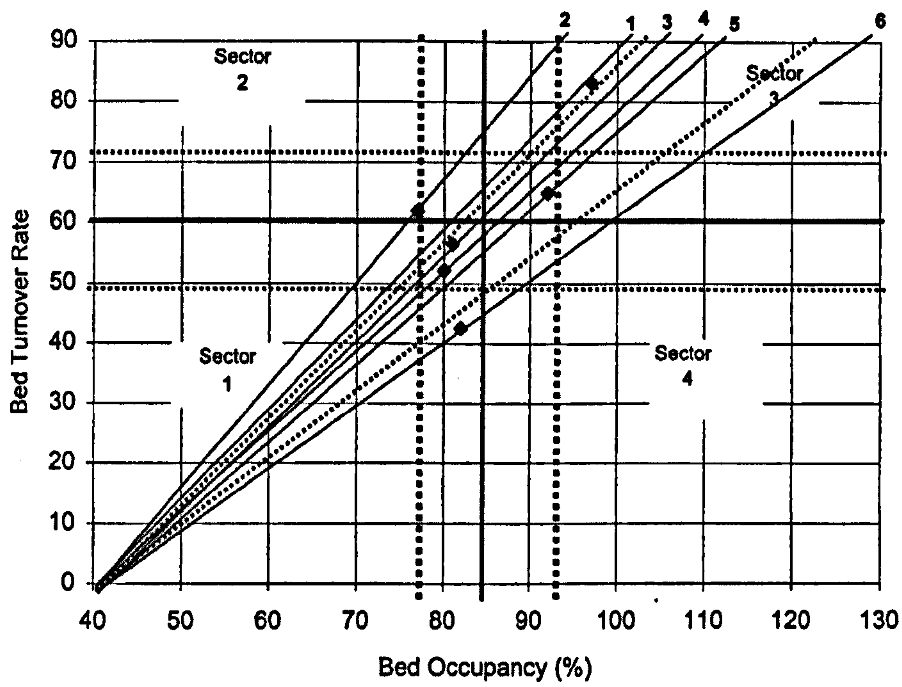
Table 5.0 Background and hospital performance indicators, study hospitals, 1997/98

Hospital	Provincial Population	Beds	Beds /10³	BOR (%)	BTR (%)	LOS (days)	Pat.Day /1,000	Admiss /1,000	%age Mat Admissions
1	857,318	171	2.0	97	83	4.24	70	17	25
2	1,033,336	160	2.0	77	62	4.56	44	10	38
3	1,302,214	250	1.9	81	57	5.23	57	11	26
4	1,221,845	235	1.9	80	52	5.57	56	10	31
5	1,537,676	223	1.5	92	65	5.18	50	9	37
6	591,747	156	2.6	82	43	7.05	79	11	29

Notes: Number of beds and performance indicators are based on statistics from selected in patient wards (MSW. MMW, FSW, FMW, CMW, CSW, and MAT)

Hospitals 3 and 4 fell in sector 1. They all fell within the "expected performance area" which means that they performed in accordance with expected performance of hospitals at that level. The hospitals had similar bed use rates (admissions) of 11 per 1,000 and 10 per 1,000 respectively. The number of tertiary beds per population is the same for the two hospitals—2 beds per 10,000 people. Hospital 5 fell in sector 3 and within the expected performance zone. It has 1.5 beds for 10,000 people. These results generate an expectation that hospital cost analysis results for the three hospitals (3, 4 and 5) will reflect average or expected performance.

Figure 5. Simultaneous Analysis of Hospital Service Indicators for the Six Provincial Hospitals



The other two hospitals (1 and 6) were outliers but with different "distances or deviations " from the expected performance zone. The magnitude of the deviation from the norm helps to distinguish between hospitals that fall within the same sector. Hospital 6 was located in sector 1 (suggestive of inefficiency). It had a comparable bed occupancy rate of 82% and the lowest bed turnover rate (43%). This is characteristic of hospitals with low bed turnover rates and/or longer length of stay due to excess bed capacity. It had the highest average length of stay of 7 days. Low demand seems an unlikely reason for this poor performance given its bed use. What is interesting is that the hospital had the highest bed use per capita of 0.079 (79 inpatient days per 1,000 people), and 11.2 admissions per 1,000 compared to an average across hospitals of 11.3 per 1,000 for 1997/8 year. Excess capacity seems to be a likely cause. The region has a population of 591 747 (Census 1992), and the number of beds per 10 000 is 2.6. This figure is the highest of the group, even though other regions have populations at least twice its population size. Further analysis of other possible determinants for this poor performance is required.

Hospital 2 is located in Sector 2 on the border of the expected performance zone. Its performance is rated intermediate with high bed turnover but relatively low bed occupancy rate. This could be due to unnecessary hospitalisation or a high number of normal deliveries in the hospital. The contribution of maternity cases (both normal and abnormal) was highest at 38% of total admissions. Inpatient days were 44 per 1,000, the lowest of the group, and the number of tertiary beds per 10,000 for the region is 2 (equals the average across the regions). Admissions were 10 per 1,000, which is comparable with other hospitals. The low patient day per capita (0.044) bears testimony to its high bed turnover rate.

Hospital 1 is located in the most desirable area (Sector 3): high bed occupancy and bed turnover rates. It is an extreme outlier with the highest performance indicators. It had 70 inpatient days per 1,000 and the highest admissions rate of 17 per 1,000 (1.5 times the average of 11 per 1,000). The number of tertiary beds is 2 per 10,000 and that is comparable with other regions. It seems other external and internal supply side factors (organisation and management, and regional referral systems) are possible explanatory factors.

It is clear from this analysis that each hospital is showing a distinct pattern in utilisation which justifies a detailed case study analysis to fully understand the apparently diverse determining factors. In order to explore whether or not similar differences obtained at ward level across hospitals, the Pabon Lasso framework was applied to medical ward[31] data (Table 5.1 and Figure 5.1).

[31] This include combined statistics for the female, male and children's medical wards. BTR (mean =54.66, 95% CI = 38.79-70.53), BOR (mean = 69.39, CI = 50.49-88.30), and LOS (mean = 4.75, CI = 3.48-6.02).

Table 5.1 Medical Wards Activity Statistics, Provincial Hospitals (1997/98)

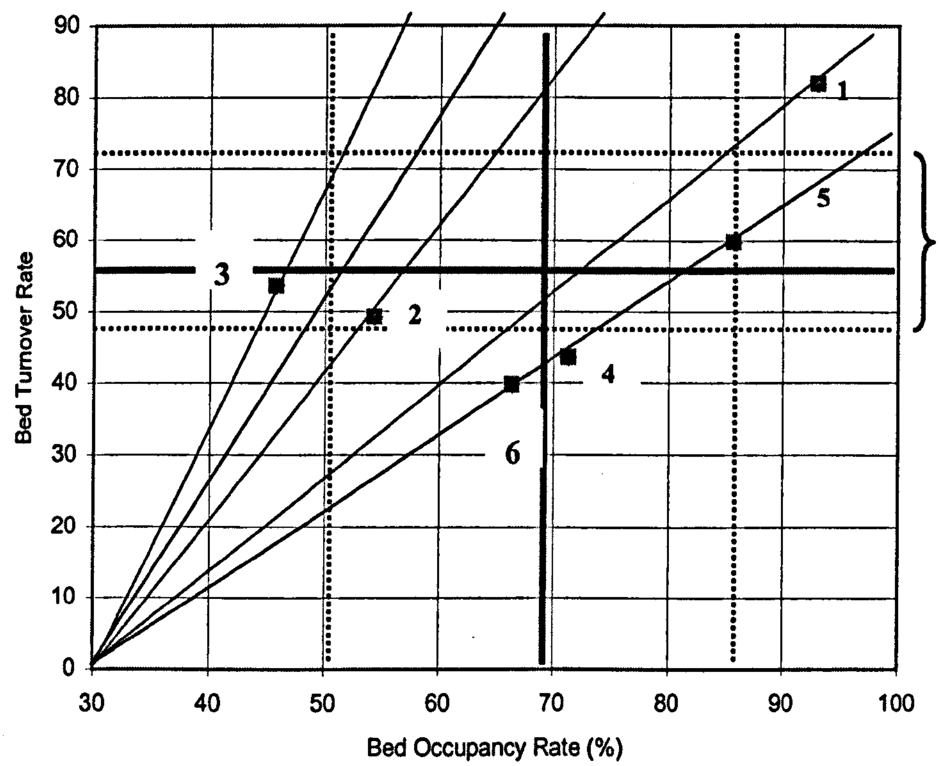
Hospital/Indicator	Medical Beds	BOR	BTR	LOS
1	81	92.98	81.93	4.1
2	78	54.28	49.23	4.0
3	117	45.75	53.54	3.1
4	112	71.28	43.63	6.0
5	94	85.69	59.82	5.2
6	72	66.36	39.81	6.1

Medical wards for Hospitals 1 and 5 are placed in sector 3 with Hospital 1, a distinct outlier. Hospital 6's medical wards are placed in sector 1. This picture is similar to that observed at hospital level except that Hospital 4 is now placed in sector 4 (characterised by long stay), and Hospital 3 and Hospital 2 are placed in sector 2 and 1 respectively swapping their earlier positions. The analysis of the results applied to medical wards is similar to that for the whole hospitals. These findings support the argument that the hospital is the appropriate level of analysis for this study.

5.8 Summary of findings and remarks

The Pabon Lasso method showed that 50% of the hospitals were outliers, whilst the other 50% (Hospitals 3, 4 and 5) fell within the range of average performance. The hospitals fell in sectors 1, 2 and 3, and none in sector 4. Hospital 1 appears to be an impressive performer and Hospital 6 the opposite. Similar results were found when utilisation indicators of medical wards were placed within the same framework. Variation in hospital service statistics is a function of many factors: demand or supply, hospital size, clinical practice, morbidity patterns, and randomness (McPherson 1988, Rhodes et al 1997). Therefore it is hazardous to make firm conclusions based on these results without exploring the other factors. Succeeding chapters attempt to provide some answers and clarifications of these issues. The major finding here was that, even though the study hospitals were tertiary hospitals, they had some distinctiveness, and it would have been improper to treat them as homogenous in evaluating performance. Each one of them deserved a thorough analysis of possible determinants of its performance.

Figure 5.1 Simultaneous Analysis of Hospital Service Indicators for the Six Provincial Hospitals' Medical Wards



CHAPTER 6 COSTS OF HOSPITAL SERVICES IN PUBLIC HOSPITALS

6.0 Introduction

Hospital costing is a complex process especially in developing countries where data quality and accuracy is a problem. However, it is important that hospital costs be understood as they consume significant amounts of resources (Barnum and Kutzin 1993, Zwanziger et al., 1993). Furthermore, an understanding of resource use and flows within a hospital creates opportunities for effective and efficient use and control of resources. Costs and technical efficiency are key dimensions of hospital performance. It is important to state at the outset that concepts of hospital efficiency measurement are still in an evolutionary process and there is still some debate as to which model best meets the peculiarities of a hospital. This chapter has two main objectives: (1) to provide a detailed cost analysis of six tertiary hospitals in Zimbabwe using cost accounting methods at two levels—hospital and ward level, and (2) to draw insights into relative efficiencies at both these levels. The first section describes the methods used in the study and the second section presents the results of hospital costs analysis. The third section is a discussion of the results, and tentative conclusion.

6.1 Methods

6.1.1 Data collection techniques

The study employed a cost accounting procedure for hospital costs analysis—the step-down costing method to measure unit (average) costs (Luce et al., 1996, Drummond et al., 1997). This method was chosen because there are only seven provincial hospitals in the country, and the use of statistical methods would have yielded no better results than a detailed examination of each hospital cost that this method entails. The application of statistical methods in assessing hospital efficiency in a few African countries (Anderson 1980, Bitran-Dicowsky and Dunlop 1989, Wouters1995, Kumaranayake 1998) has yielded interesting results but of questionable quality and use because of the nature of

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The third step was the identification of other departments that provide services to the final departments. These can be put into four different categories. Category 1 is what might be called the para-medical services such as theatre, dietetics and physiotherapy. Category 2 consists of the medico-technical functions such as laboratory, x-ray, pharmacy and dietetics. Category 1 and 2 are generally known as intermediate departments. They provide services to other departments but also provide direct services to patients. Category 3 includes ancillary departments, which include logistics/transport, hotel services and laundry. These services are required for all the other departments to function. Category 4 includes overhead departments (administration, utilities, domestic services and maintenance). These departments provide indirect services to all other departments. The last category includes infrastructure (buildings, maintenance, and fixed equipment and others). Again, this category serves all the other departments.

Once the anatomy of the hospital was clearly defined and understood (see Table A6.0 for a typical tertiary hospital), the fourth step was to establish the total costs for the hospital in the financial year 1997/98. Total cost did not just include expenditure of government votes but also expenditure of any other extra-budgetary resources (including donations). Public hospitals in Zimbabwe get budget allocations for non-salary recurrent expenditure as line items, and accordingly, expenditure is recorded by line item. The line items include: medical and surgical, office miscellaneous, post and telecommunication, printing and stationery, domestic services, vehicle hire, travel and subsistence, official travel, fares, fuel, lights and water, laundry and bedding, and linen. All extra-budgetary purchases and expenditures from the Hospital Services Fund[32] were broken down by line item and added to the total line item costs per year. In order to calculate salary costs, an inventory of staff (type, grade and number) by department was carried out. The total annual salary cost was calculated by multiplying the number of people by their salary grade midpoints (including allowances). Through this process a complete picture of the total recurrent costs for the hospital was established.

[32] Hospital Services Fund is a fund set up by hospitals from the user fee revenue collected and any donor funds.

The fifth step was to establish the annual equivalent capital costs for each hospital by department. A thorough inventory (quantity and type) of all the equipment and furniture in each hospital department was carried out. The inventory was then subjected to a screening process to identify the real capital items using both the WHO definition— any item that costs US$100 or ZW$3,700[33] (WHO 1994), and lasts for more than one year. Replacement costs were obtained through a market price survey conducted in Harare where most of these items are procured through the Central Purchasing Authority. There was no evidence in Zimbabwe that suggested significant regional price differentials for medical equipment and furniture. Private procurement of equipment and furniture was rare except in cases of donations. For donated items the prevailing market price was used.

Using Excel spreadsheets, the annual equivalent costs were calculated through an annuitisation process. This method was chosen because it takes into account both depreciation and the opportunity cost of capital (Kumaranayake 2000). The real market discount rate of 5%, and 5 or10 economic life years (ELY) for equipment and furniture (10 years where the manufacturer specified) was used. A real market discount rate of 5% was used because it corresponded with the average real interest rate in the money market for assets such as treasury bills and bank deposits in the past 4 years in Zimbabwe (CSO 1997, Hansen et al., 2000). The Zimbabwean Government does not prescribe the discount rate for public projects or investments, as the government does in the UK and Canada. A rate of 5% is widely used in cost analyses (Crease and Parker, 1994, Drummond et al., 1997, Gold et al., 1996). However, there is still disagreement on the choice of the discount rate and the theoretical underpinnings of discount rates (Krahn and Gafni 1993). Because of this, it has been argued that sensitivity analysis using discount rates of 3-10% is necessary. However, sensitivity analysis was not conducted for this owing to the centrality of recurrent costs to its conclusions (11.3.2) Nonetheless, capital costs are presented as total costs by ward and hospital to allow for future manipulation of the data.

[33] 1997/987 annual average exchange rate was 1US$=ZW$37

Buildings were a problem to cost because most of them were built more than thirty years ago which technically means a zero book value should be ascribed despite the fact that these buildings are in use. An alternative was to use rental value but this was a problem to establish because the study hospitals are located in regional towns where property/ rental markets are underdeveloped. To address this problem information was sought from the Ministry of Health's quantity surveying unit (Family Health Project II[34]) regarding the replacement costs of a typical 200-bed provincial hospital. A figure of ZW$250 million was established. This figure was annualised using a building life span of 30 years. The annual building equivalent cost was then directly allocated to hospital departments on the basis of floor area. This meant that the only source of variation in building costs across the hospital was between departments (depending on their size) since the aggregate was the same. This was clearly a second best solution in comparison with the use of hospital space and construction costs per square metre.

The sixth step was to apply the step-down costing procedure by allocating all direct costs to medico-technical, ancillary and overhead cost centres (Table 6). Some of the line items could not be allocated to any specific intermediate department. Accordingly, these were allocated to all the departments directly through various criteria depending on the availability and quality of use or consumption data for each line item. Difficulties were encountered in apportioning relatively unimportant costs like office miscellaneous and printing and stationery. In all the hospitals there were no complete records on the use of office miscellaneous funds, and it was allocated on the basis of number of departments in the hospital. In such cases it was important to make sure that the hospital cost structure was not unnecessarily affected by allocating costs that do not have reliable use pattern data. Domestic services and utilities were allocated to all departments on the basis of floor space. Hospital architectural plans, and in some cases actual measurement of the floor areas was carried out in order to have reliable apportionment proportions. Each of the hospitals had a nursing and /or environmental health technicians' school. Eighty percent of the printing and stationery costs were allocated to the hospitals and 20% to the schools (reached after discussing with the schools authorities). The 80% of

[34] Family Health Project is a World Bank funded infrastructural development project responsible for construction and refurbishment of Ministry of Health facilities.

the printing and stationery costs was allocated to the final cost centres on the basis of number of inpatient admissions by ward. Post and Telecommunication was allocated to departments on the basis of number of staff in each department. This vote is largely used for paying telephone bills.

Table 6.0 Step 1: Allocation of Line Item Costs to Intermediate Departments

Line Item	Department	Reasons/Remarks
Doctors and Matrons' salary costs	All medical departments	Allocated on the basis of patient days by ward
Mortuary	All inpatient departments	Shared on the basis of inpatients
Provisions	Kitchen	Line item for purchasing inpatient food
Medical & Surgical	Pharmacy	For drugs and other medical supplies
Office Miscellaneous	All departments	For office miscellaneous
Printing & Stationery		Hospital stationery
Fares	Administrations	Air, bus or train tickets for business travel
Travel & Subsistence	Administration	Subsistence money on business travels
Vehicle Hire	Transport	For hiring vehicles from CMED
Bedding and Linen	Laundry	For purchasing hospital and repairs
Fuel, lights & Water	All departments	
Domestic Services	All departments	For housekeeping
Official Travel	Administration	For official mileage on business travel
Laundry	Laundry	For washing detergents or purchase of laundry services
Post & Telecommunication	All departments	For telephone bills

After allocating all direct costs to intermediate costs and other costs directly to the final units, the next step was to allocate intermediate department costs to the final or primary cost centres using different apportionment methods as shown in Table 6.1. Some intermediate departments have reciprocal relationships (for example administration with laundry and kitchen) and such costs could be allocated in a number of ways, for example, using simultaneous equations or introducing a fourth level in the step-down analysis where the allocated administrative costs are built back into the final cost centre (Drummond et al., 1997). The latter approach was used in the study.

Table 6.1 Step 2: Allocation of Intermediate Department Costs to Final Cost Centres

Department	Apportionment Criteria
Theatre	Allocation was based on theatre utilisation statistics by source of patients (final cost centres). In cases where these statistics were unavailable, apportionment was done on the basis of admissions. The assumption being that patient volume is directly related to theatre workload
Pharmacy	Costs apportioned on the basis of patient days, and outpatient equivalents calculated using actual drug consumption figures for a sample of inpatients and outpatients (Ratio of 1:7)[35]
Laboratory	Allocation was on the basis of laboratory proportionate use by source or admission proportions
Administration	Administration was shared on the basis of patient days and outpatient equivalents
Mortuary	This was shared on the basis of admissions
Laundry	This was shared on the basis of patient days
Physiotherapy	This was apportioned on the basis of admissions
CSSD	Apportionment was on the basis of proportionate use by final cost centres (packs sterilised).
Kitchen	This apportioned on the basis of patient days after adjusting for staff shares where this occurred.

The final stage was the calculation of unit costs by dividing total recurrent costs, and total costs of the final cost centres by the number of inpatient days, admissions and number of beds. Service statistics for each ward were compiled from the inpatient registers. In Hospitals 1, 2 and 4 wards were not organised into surgical and medical wards but by sex and age: male, female and children's wards. For instance, the male ward had both surgical and medical patients and utilisation statistics were combined. Statistics from Hospital 3, which had complete and reliable statistics by ward, were used to calculate the relative proportions for allocating costs by ward for hospitals 1, 2 and 4. By design, this adjustment did not affect the overall unit cost per patient but the pattern of resource use between wards. An alternative option was to ask sisters-in charge of wards to estimate patient mix, but this was likely to be variable and subjective. The final outputs of the process were average costs per patient day, per admission and per bed including and excluding capital costs for the six hospitals.

[35] An outpatient equivalent was calculated on the basis of inpatient day equivalents and the average length of stay. An inpatient day equivalent was calculated on the basis of a ratio (1/7) established by comparing drug consumption by inpatients and outpatient in a sample of patient over a given period. Literature recommends ¼ (Barnum and Kutzin 1993) based on some American studies, which was not deemed appropriate in this study.

6.1.3 Limitations

The use of a cost accounting method to estimate relative efficiency (average cost or unit cost) has inherent problems. It assumes, for instance constant marginal costs (see Chapter 2). However, we expect that the marginal cost of treatment in acute hospitals is high during the first days in hospital and lower in the last days, and therefore assuming a constant MC might result in overestimation of daily costs. Within a given operation scale it is possible to increase the number of outputs without necessarily increasing the costs. Whilst it is important to know changes in costs due to changes in input prices (for example), public hospitals are hamstrung by bureaucratic rigidities such that their input and output mix is not responsive to such price changes.

The results of costing studies can be difficult to interpret if the case mix and case severity is unknown (See Chapter 5). Butler (1995) defines case mix as:

> "... the mix of cases treated by a hospital classified on the basis of those criteria which are significant in explaining the differences in resource usage between the various cases treated".

Mahapatra and Berman (1994) used a similar definition. Key to the definition of case mix and case severity is that resource use intensity per group of cases is homogenous. Common approaches to dealing with case mix are: using several output categories based on some classification scheme (ICD-10 and DRGs), and the development of case mix indices. There has been little application of the ICD-10 or DRGs in LMICs due to data problems. Variants or adaptations have been used in a few developing countries: for example, in El Salvador by Fiedler et al., (1997). Fiedler and colleagues categorised hospital admissions under three broad diagnostic groups (medical, surgical and maternity). The assumption was that major surgeries and maternity cases would give an idea of the case mix. Nonetheless different approaches to case mix standardisation are problematic because it is difficult to find a comprehensive classification scheme that results in few homogenous categories that are practical to handle, and can be easily institutionalised.

Despite the availability of theoretical constructs that are practically defensible in developed countries but not so in most LMICs, this study took an approximate but pragmatic approach to addressing the issue of case mix in Zimbabwe. That is using wards (medical, surgical and maternity split by age and sex) as the broad diagnostic groups (Mahapatra and Berman 1995). Clearly, this attempt at standardisation leaves some scope for case mix variations to contribute to an explanation of unit cost variation. Using wards loosely defined here as diagnostic groups, unit costs were calculated.

6.2 Results

The following results include hospital outpatient costs, even though this was not part of the principal focus of the study. Inclusion of OPD costs enables an analysis of the appropriate use of the hospital, and the relative cost consequences of inpatients and outpatients.

6.2.1 Unit Cost Analysis

6.2.1.1 Hospital Level

The total annual cost for inpatients (selected wards mentioned earlier) and outpatients (including casualty and ANC) for the six tertiary hospitals was ZW$201.211 million, with an average of ZW$33.535 million per hospital. Of this total, 79% (ZW$159.080 million) was for inpatient and 21% (ZW$42.131 million) was for outpatients[36]. Hospital specific relative proportions of inpatients and outpatients ranged from 74-85% and 15-26% respectively. To a large degree, the distribution of costs reflects an expected resource use pattern where hospitals focus on their core business, which is hospitalisation. However, the percentage of outpatient services that hospitals provide depends on country policies. Table 6.2 shows total costs per hospital broken down into recurrent and capital costs.

[36] These figures are based on aggregate inpatient and outpaient totals for the six hospitals. Inpatients costs constituted 76-79% of total costs and outpatients costs 21-24% fo total costs

Table 6.2 Hospital Costs by Study Hospital (ZW$'000[37])

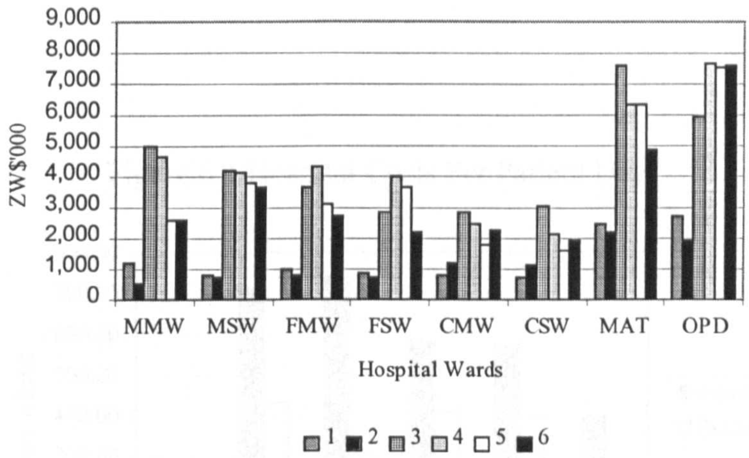
Hospital	Recurrent Costs	Capital Costs	Total Cost
1	7,876 (64%)	4,400 (36%)	12,276 (100%)
2	7,270 (41%)	10,568 (59%)	17,838 (100%)
3	29,231 (69%)	13,222 (31%)	42,453 (100%)
4	28,011 (70%)	11,853 (30%)	39,865 (100%)
5	22,920 (41%)	32,507 (59%)	55,427 (100%)
6	20,256 (61%)	13,097 (39%)	33,353 (100%)
Total	115,564,845	85,646,902	201,211,747

Hospital 5 had the highest total cost of ZW$55 million in 1997/98 financial year. Hospital 1 had the least total costs with ZW$12 million followed by Hospital 2 with ZW$17.8 million. Hospitals 3, 4 and 6 had average hospital costs. Four hospitals had recurrent cost proportions to total costs of more than 60% (ranged from 61% to70%) whilst Hospitals 2 and 5 had proportions of 41% each. Recurrent costs were a major component of hospital costs, and therefore important in analysing cost structures and cost efficiency across hospitals.

The proportion of annual equivalent capital costs to total costs ranged from 31-59%. Hospitals 5 and 2 had the highest with 59% apiece. A total annual equivalent capital cost of ZW$85.6 million for the six hospitals is indeed low given the lack of comprehensive and audited capital equipment and furniture lists at some of the hospitals. Although these capital costs are the best estimates to date, the major source of hospital cost variation between hospitals seems to be in recurrent costs. Moreover, capital costs are controlled from the centre and are therefore less likely to reflect different organisational and management practices across the hospitals.

[37] Annual average exchange rate for 1997/98 was 1US$= ZW$37

Figure 6.0 Hospital Recurrent Costs by Ward Across Hospitals FY 1997/98



6.2.1.2 Ward Level

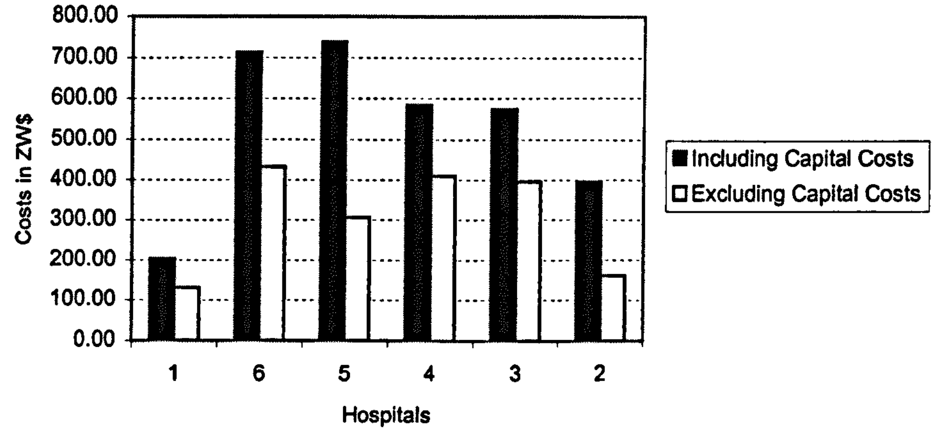
Costs for six hospital inpatient departments are presented: male medical ward (MMW), male surgical ward (MSW), female medical ward (FMW), female surgical ward (FSW), children's medical ward (CMW), children's surgical ward (CSW) and maternity ward (MAT)[38]. These departments were identified as core hospital primary service departments[39], common across study hospitals and therefore comparable. Outpatient costs are also presented for comparison purposes, and to allow for rudimentary exploration of allocative efficiency questions. Figure 6 shows the total recurrent cost profile of the study hospitals by ward.

The profile reflects a similar pattern to that observed at hospital level. Hospitals with high recurrent cost proportions (e.g. hospital 3, 4 and 6) had relatively high departmental costs. Hospitals 1 and 2 had consistently lower departmental recurrent costs (even lower than the average) compared to the rest. The maternity ward and the outpatient department had high levels of costs probably associated with high activity volume.

When capital costs are included Hospital 5's total ward costs become consistently higher across wards (Table 6.3). Total ward costs ranged from ZW$1-9 million dollars per annum.

[38] Other departments that are not necessarily present in each hospital, namely male orthopaedic ward, post-natal ward, gynaecological ward, intensive case unit (present at Hospitals 5 and 3), psychiatric ward, and eye unit are not included.

Figure 6.1 Hospital Costs Per Patient Day



The average recurrent and total costs per patient day are shown in Figure 6.1 (see also Tables A6.1 and A6.2). The recurrent cost per day ranged from ZW$130-433 with a mean of ZW$306. Hospital 6 had the highest with ZW$433 followed by Hospital 4 with ZW$410. Hospital 1 and 2 had average recurrent costs per patient day of ZW$161 and ZW$131 respectively. These costs were 50 percent of the average across the study hospitals.

Table 6.3. Total Cost by Ward by Study Hospital in ZW$'000 (FY97/98)

HOSPITAL/ WARD	MMW	MSW	FMW	FSW	CMW	CSW	MAT	OPD	TOTAL
1	1,574	1,047	1,394	1,182	1,090	998	3,415	3,148	13,848
2	1,183	1,617	1,792	1,786	2,057	1,811	3,891	3,701	17,838
3	6,506	5,602	4,338	3,559	3,401	3,769	8,787	6,491	42,453
4	5,336	4,740	4,813	4,586	2,749	2,388	6,992	8,261	39,865
5	6,711	5,112	6,803	7,505	4,192	3,879	8,709	12,517	55,428
6	3,249	4,476	3,344	2,662	2,707	2,349	6,553	8,014	33,354

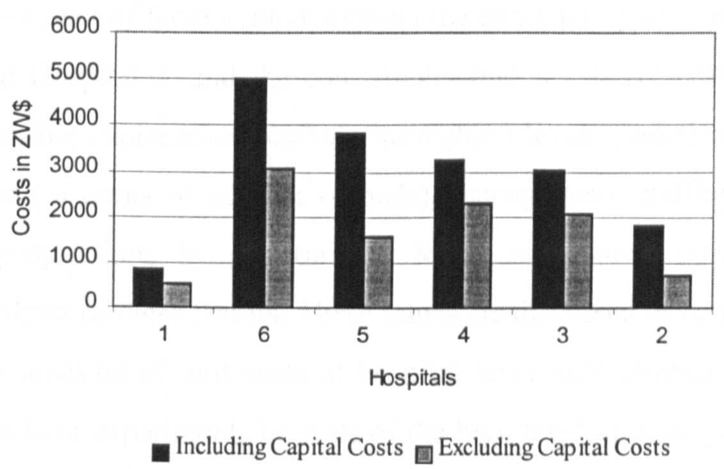
The average total cost per day provides different hospital rankings (Figure 6.1). It ranged from ZW$204-739. The overall mean average total cost per day was ZW$535. Hospital 5 had the highest average total cost per day ZW$739 followed by hospital 6 with ZW$713. Hospitals 1 and 2 maintained low patient day cost profiles.

[39] Zimbabwe does not have a defined package of tertiary hospital care

Hospital 6 had the highest average recurrent cost per admission of ZW$3,816, Hospitals 5, 4 and 3 were in the region of ZW$1,500 to ZW$2,500, and hospitals 1 and 2 had the least cost with ZW$554 and ZW$733 respectively (Figure 6.2 and Table A6.1). The mean recurrent cost per admission was ZW$1,712, which is at least twice as much as that for Hospitals 1 and 2.

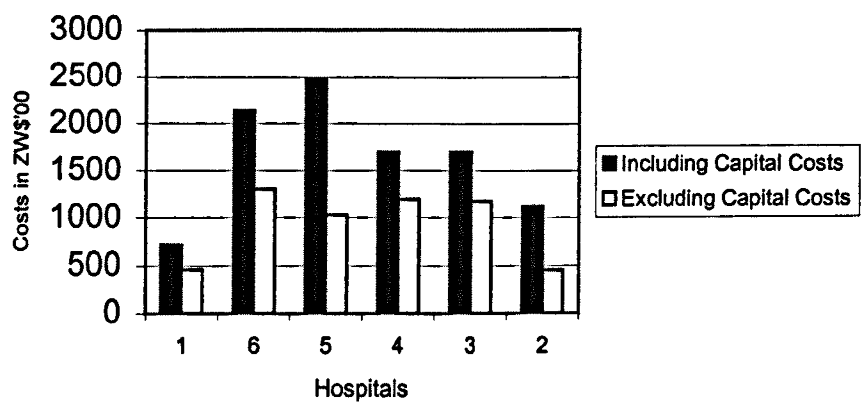
The total cost per admission ranged from ZW$863 to ZW$5,023, and the mean across the hospitals was ZW$2,961. The cost per admission profile is similar to that depicted by recurrent costs: lower costs for Hospital 1 and Hospital 2, highest cost for Hospital 6, and intermediate costs for the rest. Only hospital 5 changes in ranked position depending on whether on the inclusion or exclusion of capital costs.

Figure 6.2. Hospital Costs Per Admission Across Study Hospitals



Cost per bed is the total cost of admissions per bed during one year. This means that holding everything else constant and assuming positive marginal cost per admission, an increase in the bed turnover rate results in an increase in the cost per bed. Recurrent cost per bed ranged from ZW$45,388 to ZW$129,848 per annum, and the mean was ZW$93,374 (Figure 6.3). The cost per bed for hospitals 6, 5, 4 and 3 was comparable. Again, hospitals 1 and 2 had relatively lower costs per bed. Lower costs could mean low hospital throughput (low admission rates), which might mean productive inefficiency. The key question that emerges from this analysis is whether or not this consistency in low unit costs (per patient day, per admission and per bed) in Hospital 1 and Hospital 2 can be interpreted as technical efficiency or poor quality of services, or simply case mix differences.

Figure 6.3. Cost Per Bed Across Hospitals



A number of factors might explain the consistently low relative unit costs for Hospital 1 and Hospital 2, and the consistently higher relative costs of the other four hospitals. Possible explanations include throughput levels , relative technical efficiency, hospital size (in terms of number of beds), management, staffing levels or relative budgetary appropriations by government. More explanatory power is generated through an analysis of these factors. These issues are discussed in succeeding sections.

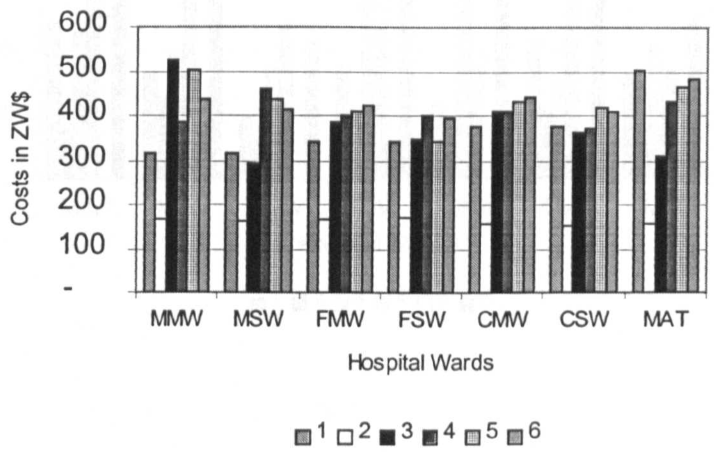
An analysis of unit costs at hospital level may obscure possible differences between inpatient departments because of the high level of aggregation. Whilst wards, to a large extent reflect costs for fairly homogenous groups of patients (at least in terms of case mix but not necessarily case severity), they still harbour a fair amount of heterogeneity. In this study, the effect of case severity could have been further reduced by separating the costs of ICUs[40], but these were only present at Hospital 5 and Hospital 3. The ICUs as they exist now are not well-defined departments. They simply represent beds set aside in the main wards for very ill patients—more akin to a separation ward. Because of this, computed ward costs include ICUs' costs where they existed.

[40] It was impossible anyway to separate the costs of ICUs (basically separate beds in the main wards) because there was no mechanism of apportioning the shared resources like staff, drugs, etc.

On a ward to ward basis there is some general similarity in the disparity pattern in the recurrent patient day costs as that observed at hospital level of analysis (Figure 6.4). What is noticeable, however, is that hospitals 5, 6, 4 and 3 had relatively higher average recurrent cost per patient day per ward compared to hospitals 1 and 2 except for the maternity ward. Hospital 2 had the least recurrent patient day costs which were invariably below ZW$200 across the six wards. The relative performance of the six hospitals on a ward to ward basis was generally similar to that suggested by hospital level results.

Maternity costs were generally higher across the hospitals-Hospital 1 had the highest with ZW$504 and Hospital 2 had the least with ZW$158. For Hospital 1, the recurrent cost per day between different medical and surgical wards was the same, that is, between MMW and MSW, FSW and FMW, and CMW and CSW. This is interesting because like in the other hospitals, cost differences were expected due to the differences in broad case mix between the medical and surgical wards. What is also interesting is that Hospital 1, which generally had lower costs was the most costly for maternity. This higher relative cost for maternity can be attributed to the shorter stays in hospital (3 days compared to a national average of 6 days (MOH 1998)). Maternity cases (uncomplicated cases) are usually discharged a day or two post partum.

Figure 6.4 Average Recurrent Cost Per Patient Day Across Study Hospitals



In order to explore the relative importance of intra-hospital and inter-hospital variation bivariate Pearson Correlation Coefficients (**r**) were computed between ward average recurrent cost per patient day and the mean average recurrent cost per day of other wards. Table 6.4 shows some descriptive statistics for the average recurrent cost per patient day across the six hospitals. The range for the mean cost per day for all wards the hospitals was ZW$334-392. There was a significant correlation between ward average recurrent costs per patient day across the hospitals except for the male medical ward. This high correlation suggests that the hospital is the appropriate unit of analysis for the understanding of cost variation.

Table 6.4. Descriptive statistics of recurrent cost per patient day across hospitals

Hospital Wards	Range				
	Min.	Max.	Mean!	r[41]	p-value
MMW	166	526	388.33	0.77	NS
MSW	161	459	346.67	0.97**	0.024
FMW	169	424	355.00	0.99*	0.000
FSW	172	401	333.67	0.94*	0.005
CMW	160	441	371.50	0.99*	0.000
CSW	153	418	348.33	0.99*	0.000
MAT	158	504	392.00	0.82**	0.048

Note: * significant at 0.01 significance level, ** significant at 0.05 level, ! = mean ward average cost per patient day across similar wards for all the six hospitals.

[41] Measures the relationship between unit costs per ward and the overall mean unit cost of other wards.

Figure 6.5. Average Recurrent Cost Per Admission Per Ward Across Study Hospitals

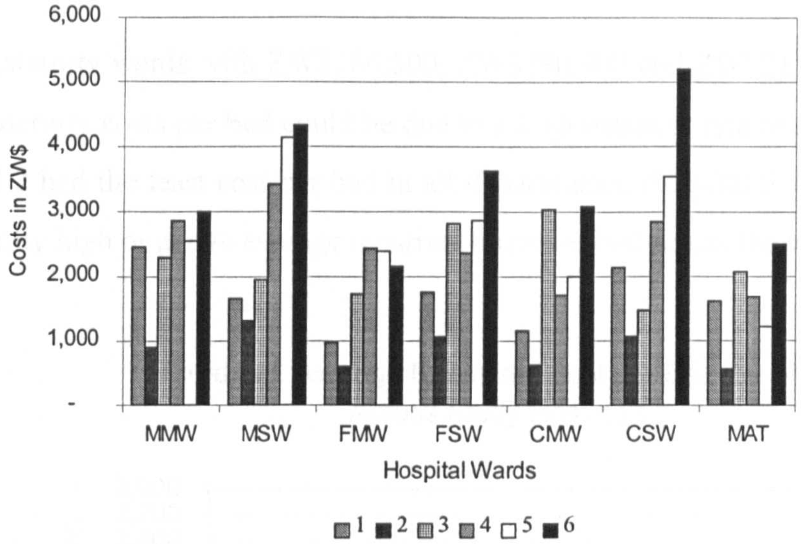


Figure 6.5 shows the recurrent cost per admission for the six hospitals. Hospital 6 had consistently higher costs per admission for most of the wards (MMW, MSW, FSW, CMW, CSW and MAT, with ZW$2,997, ZW$4,358, ZW$3,629, ZW$3,068, and ZW$ 5,204 respectively) except for FMW (Table A6.3). This is expected of a hospital with relatively low bed turnover—comparable cost per patient day but high cost per admission. Hospital 2 had consistently the lowest cost per admission across the wards followed by hospital 1. The pattern of cost per admission differences repeats itself by ward which shows general consistency is resource use differences across the hospitals. Pearson correlation coefficients between each ward and the mean of the others produce a similar conclusion when carried out for admission costs as for patient days (Table 6.5). All this confirms the fact that the hospital is the appropriate unit of analysis for the understanding of cost variation.

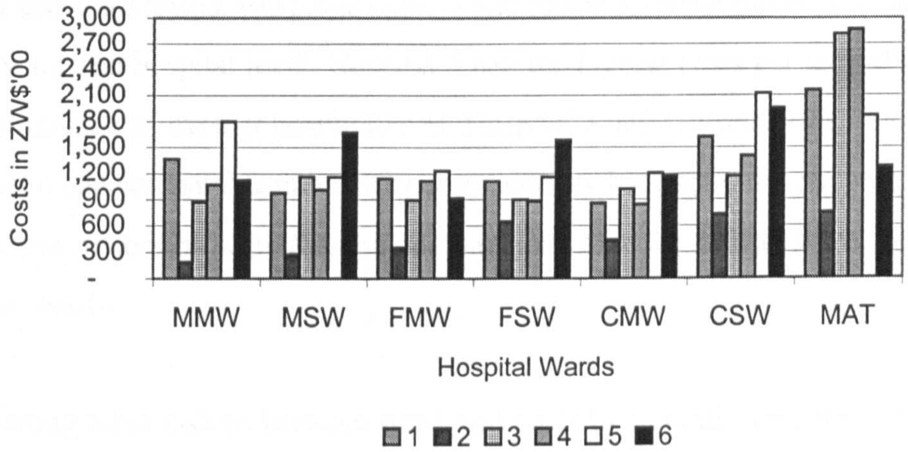
Table 6.5. Correlation Coefficients of recurrent cost per admission across hospitals

Ward	MMW	MSW	FMW	FSW	CMW	CSW	MAT
R	0.85*	0.85*	0.83*	0.95**	0.71	0.83*	0.62
p-value	0.03	0.03	0.04	0.00	0.12	0.04	0.19

Note: ** significant at 0.01 level, * significant at 0.05 level

Recurrent cost per bed depicts a different scenario from the general cost pattern presented this far (Figure 6.6). The cost per bed was particularly high for hospitals 4, 3 and 1 maternity wards with ZW$286,500, ZW$280,900 and ZW$215,800 respectively. High maternity costs per bed could be due to a high turnover rate of short stay patients. Hospital 2 had the least cost per bed in all departments. Hospital 5 and Hospital 6 had consistently high or above average recurrent costs per bed across the wards.

Figure 6.6. Average Recurrent Cost per Bed per Ward Across Study Hospitals



Correlation analysis was slightly less convincing in pointing to the hospital as the appropriate unit of analysis in the case of cost per bed (Table 6.6). The correlation coefficient was strongly significant for the female surgical ward, significant for male medical, and children medical ward. For the rest of the wards, there was no significant relationship. Maternity ward bed costs show no relationship with the other hospital ward unit costs (r = 0.29). This suggests that maternity wards exhibit differences in use patterns (demand factors and clinical decisions), and consequently resource use patterns (e.g. staff numbers and mix).

Table 6.6. Relationship between ward recurrent cost per bed across hospitals, 1997/8 FY

Ward	MMW	MSW	FMW	FSW	CMW	CSW	MAT
R	0.85*	0.78	0.92**	0.61	0.90*	0.79	0.29
p-value	0.03	0.07	0.01	0.20	0.01	0.06	0.57

Note: ** significant at 0.01 significance level, * significant at 0.05 significance level

6.3 Summary of findings

The distribution of costs between outpatient and inpatient services across the hospitals ranged from 74-85% and 15-26% respectively. The results also show that the major cost component per output was recurrent costs (at least 60% of total costs for hospitals 1, 3, 4, 6, and 41% for hospitals 2 and 5). Hospitals 5 and 2 had capitalisation levels of 59%. This partly explains why Hospital 5 had relatively higher average total costs per case at both hospital and ward levels. Hospitals 1 and 2 had lower costs per patient day and per case at both ward and hospital level. Hospital 5 had the highest costs per unit of output in most departments and even at hospital level. Hospital 3 and Hospital 4 had moderate costs. Hospital 6 had comparable unit costs per patient day but high costs per admission, possibly because of longer hospital stays. A summary of ward unit costs is given in Tables A6 and A6.1.

There were strong relationships between ward unit costs (recurrent) suggesting that the underlying resource use pattern did not differ across wards in each hospital except for maternity ward. The demand and utilisation pattern of hospital maternity services could be attributable to this. Maternity wards had characteristically high bed turnover rates due to high numbers of normal deliveries. The unit costs were also relatively high, which could have been caused by the apportionment methods used in the analysis, which relied on the number of cases without regard to severity. Overall, it would seem that the hospital was the appropriate level of analysis for this study. This justifies the focus on organisational structure of the hospital (rather than ward structure) in explaining performance variations.

These results need to be supported by an understanding of the differences in quality of services provided by these hospitals.

CHAPTER 7 HOSPITAL COSTS USING TRACER DISEASES: MALARIA AND PULMONARY TUBERCULOSIS

7.0 Introduction

There are intrinsic problems to step-down costing methodologies. First, the costing process itself is somewhat remote from the actual cost function because it assumes that the underlying cost function is linear. Second, resource use inefficiencies are hidden, because the implicit assumption is that apportioned aggregate costs are incurred appropriately. Unnecessary costs can be incurred through idle staff time, over-prescription of drugs, unnecessary diagnostic tests, inappropriate length of stay and other redundant activities. Using a combination of the "tracer" method and micro-costing method has the potential of resolving these problems.

7.1 The Tracer Method

Kessner et al., (1973) define a tracer as "a specific health problem, that, when combined into sets, allow health care evaluators to pinpoint the strengths and weaknesses of a particular medical practice setting or entire health service network by examining the interaction between provider, patients and their environment." What is important is that tracers must be identifiable and distinct conditions capable of complementing each other in shedding light on the system (or its components) under review. This method has been mostly used for assessing process and outcome aspects of quality of care (Payne et al., 1984, Mates and Sidel 1981).

The selection of tracers is crucial because it determines the validity of extrapolating from the analyses. Kessner and colleagues used the following selection criteria: (1) A tracer should reflect the activities of health professionals—they should be conditions with significant functional impact. That is, those conditions that are likely to be treated, and can cause considerable functional impairment; (2) Condition should be well defined and easy to diagnose; (3) Condition must be prevalent to allow for sufficient numbers; (3) Condition must be susceptible to the quality and quantity (or both) of the services received by the patient; (5) There must be consensus on minimal standards for managing the condition; and (6) The effects of nonmedical factors (social, cultural, economic and behavioural) on the tracer, and its epidemiology should be well understood. This criteria is adaptable and serves as a workable framework for effective application of the method by ensuring that tracers selected, reflect as mush as possible the target health system (or its components). Tracers can be used for a variety of evaluation purposes in health care (Kessner et al., 1972). For example, exploration of macro level health costs and economic efficiency (Arredondo 1997), institutional disease costing (Babson 1972, Kirigia et al., 1998, Sanyika et al., 1999), provider behaviour and quality of care (Mates and Sidel 1981, Payne et al., 1984) and differences in patient severity across hospitals (Lezzoni et al., 1996) are all implemented applications.

7.2 Micro-costing

Micro-costing is a concept based on principles of industrial engineering science, which use input-based methods of measuring resource use. It is argued to be the most detailed costing approach (Babson 1972, Drummond et al., 1997), especially when used in conjunction with randomised clinical trials or observational research (Luce et al., 1996). The approach involves direct enumeration and costing of inputs consumed in the treatment of a particular patient. Input costs are then summed to obtain a total cost which can be converted to desired units of interest— e.g. cost per case or cost per day. In a hospital context, data collection is done using time and motion surveys[42], medical chart reviews, patient diaries and periodic interviews with staff and patients. This approach can also be applied to retrospective data but it requires sophisticated information systems, and it is difficult to track some inputs after the fact (Luce et al., 1996). It is meaningful to use micro-costing when gross measures, for example average cost per day, correspond poorly with resource use or when the cost of an input is integral to the analysis (Eisenberg et al., 1984). The method has been successfully applied in various contexts (see Babson 1972, Eisenberg et al., 1984, Kirigia et al.,

[42] Eisenberg et al. (1984) define time and motion analysis as involving the observation of workers carrying out their usual activities and recording the time consumed during each step of the process.

1998, Saunders et al., 1998, Sanyika et al., 1999) Its main demerit is that it requires intensive research. Frequently, micro-costing is used in combination with gross-costing (see Chapter 6) in a single analysis in order to capture the advantages of both methods.

Use of tracer diseases in exploring hospital cost structures has an additive and complementary value to results obtained using cost accounting methods at hospital level. Systematically selected tracers can permit a systematic review of hospital resource use and efficiency issues. The rationale for conducting detailed disease costing (microanalysis) is that it can inform and complement hospital level costing (gross-analysis) in a number of ways. It allows for an exploration of different hospital cost components—drugs, medical supplies, laboratory, x-ray and hotel services. By using common diseases across hospitals with clear case definitions, the problem of case mix, and to some extent case severity, in comparing hospitals could be partially addressed.

This chapter seeks to address three objectives. First, to cost services for malaria (simple and severe) and smear positive pulmonary tuberculosis using a combination of micro-costing and gross-costing methods at the six study hospitals. Second, to profile patient costs by major input category, as a means of exploring resource use patterns and potential areas of resource wastage or inefficiencies across hospitals. Third, to relate patient level cost analysis results to hospital level cost analysis results in an attempt to predict and explain the variation in average costs at that level.

The first section 7.3, describes in detail the methods used, followed by results in the second section 7.4. The results are presented in two parts: pooled, and by hospital. The results are discussed and some conclusions drawn in the last section 7.5

7.3.0 Methods

The study design was prospective and used two tracer diseases, pulmonary tuberculosis and malaria. The choice of tracers was made by a selected panel of experts in one region of the country (Mashonaland East). The panel[43] consisted of three public health physicians and two senior nursing officers with considerable experience in the health care delivery system in Zimbabwe. The panel of experts served as a conduit for building consensus and creating opportunities for utilisation of the results. The selection process was guided by Kessner and colleagues' criteria.

Malaria and pulmonary tuberculosis were chosen because they are two of the top ten causes of hospital admissions and deaths (Provincial Health profiles 1997). In some provinces they top the list. For example, in Midlands Province, 3, 965 TB cases were hospitalised (7% of total admissions) in 1997, and 438 died (20% of all hospital deaths). Similarly, 6,525 malaria cases were admitted in hospitals (11% of total admissions), and 228 died in hospital (9% of all hospital deaths). The Department of Disease Control and Epidemiology in the MOH&CW headquarters supported the choice and provided revised national management guidelines for the tracer diseases for the study.

The case definitions used in the study are critical in the interpretation of costs and deserve to be mentioned. Case definitions vary with age, levels of malaria transmission and acquired immunity (McGuinness et al., 1998), and controversies surrounding definitions are not unusual (WHO 1990). In this study, a patient was classified as having simple malaria if she presented with a fever and either lived in or had travelled in a malarial area within the past three weeks (MOH 1998). Fever, is obviously associated with many other diseases. However, in malaria endemic areas asymptomatic infection is common such that using fever and presence of parasitaemia may lead to over-diagnosis. Low density parasitaemia may require no therapeutic intervention (Redd et al., 1996, McGuinness et al., 1998). In highly malarious areas, it is advised that any child presenting with a fever, whether or not the other obvious causes are present should receive malaria treatment (Redd et al., 1992). The Ministry of Health's policy on malaria is that of presumptive treatment, and laboratory confirmation is only required at hospital level. Similar situations prevail in Malawi (Redd 1996), the Gambia (Müller et

[43] Provincial Medical Director for Mashonaland East province, Medical Officer of Health (Maternal and Child Health), Medical Officer of Health (Disease control and Epidemiology), Provincial nursing officer, and Provincial community nursing officer.

al., 1996) and many others. Such a policy is obviously associated with the problem of false positives but the benefits of such a policy are argued to outweigh the costs.

A patient was considered to have severe/complicated malaria if she had one or any of these signs: impairment of consciousness, fits/convulsions, pallor, jaundice, "Coca-Cola" urine, breathlessness, prostration, low blood pressure, persistent vomiting or bleeding from the mucosa (MOH 1998). One or more of these features in the presence of asexual parasitaemia confirms severe malaria (WHO 1990). However, WHO acknowledges the controversies associated with definitions, and argues that for practical purposes clinical suspicion alone, on cases previously exposed to *P.falciparum* should prompt a therapeutic trial of an effective antimalarial.

The case definition for tuberculosis was described according to site and sputum status or history. Using the former, sputum positive pulmonary tuberculosis refers to a patient with two consecutive positive sputum smear examinations or with one positive smear examination and a chest X-ray suggestive for tuberculosis. According to history, a new case is defined as a patient who never received a full course of TB treatment or received treatment for less than one month (MOH 1994). The treatment protocol used for such patients is Category 1 High priority: 2 months of intensive treatment followed by a continuation phase of four months. The drug regimens are given in the Essential Drug List for Zimbabwe (EDLIZ, 1994).

Case recruitment for malaria was done using case definition (or principal clinical diagnosis), and for TB it was entirely on the basis of case definition criteria. The operationalization of case definitions was understandably a function of health provider compliance with the guidelines, and to some extent the knowledge and experience of research assistants used in the study. The study did not seek to evaluate the national protocols but simply to use them as constructs of experts' consensus whatever their shortcomings.

For practical purposes secondary diagnosis was not considered in the recruitment exercise. Comorbidities were common confounders especially for TB cases. In 1998, it was estimated that 90% of all admitted TB cases were HIV-related (MOH, 1998). During the study no HIV/AIDS related drugs were available in public hospitals, which could have significantly inflated the costs. These could be obtained through the private sector. An attempt was made in the study, however, to explore costs of secondary or opportunistic infections by separating TB drug costs from non-TB drugs. As the results will show, a greater proportion of drug costs was TB related. HIV/AIDS morbidities considerably influence patient management and in the Zimbabwean context where HIV prevalence among adults is 20.3%, cases are likely to be homogenous in that respect. HIV serostatus increases length of stay in hospital (Migliori et al., 1999), but because of home-based care programmes for chronic illnesses that are in place, this may not have applied to the patients studied. Overall cost of treatment for TB was likely to be affected by comorbidity as treatment may have included attempts to control HIV related conditions (Saunderson, 1995, Nuun et al., 1993), however homogeneity is retained given 90% HIV/AIDS prevalence among the patient group.

The target sample size was set at 300 TB cases and 300 malaria cases, that is, 50 cases of each disease at each of the sample institutions. Time and resource constraints influenced the sample size. However, only 207 malaria cases and 158 TB cases were recruited for a variety of reasons. Data collection commenced in January 1999 and ended in June 1999. The malaria season in Zimbabwe starts around November and ends in April, and this meant that by the time the researcher reached the last hospital (Hospital 6) the malaria season was over. Therefore no malaria data for Hospital 6 was collected. Optimal timing of the study could have avoided this problem. However, it was impossible to time activities perfectly. The start date was pre-determined by the PhD programme. Working with hospital staff on other aspects of the study (qualitative component) was difficult to time because of the unpredictable nature of hospital activities. For example, it was not uncommon to have an interview with a doctor interrupted by an emergency, or for key hospital staff to be called to a meeting or workshop at headquarters without notice. The other reason for under-recruitment was that the process of selecting cases meant that all cases presenting with signs and symptoms of the two diseases were initially recruited (to ensure effective capture), and some cases were eventually dropped when it became clear that the condition was something else. However, the fall out rate was minimised because the research assistants were experienced nurses, who could recognise malaria symptoms, and read and understand patient notes competently. In some cases, patients stayed in hospital for more than a month when research assistants were only employed for a month. These were also excluded. TB data from Hospital 5 was totally discarded because of poorly recorded patient information, which was inconsistent and inaccurate.

Patient recruitment was carried out in the morning at the hospital outpatient or casualty department. Any case that presented with signs and symptoms of any of the tracers, and was subsequently admitted was recruited into the cohort. Research assistants worked closely with hospital admission staff to make sure that most of the cases were recruited. Suspected TB cases identified and followed before admission for at least a day at the outpatient department when they came for laboratory tests and/or chest X-rays. This is because suspected cases were only admitted after confirmation of diagnosis. Once recruited each patient was given an identifier code and followed up from the time of admission in hospital to discharge.

A mixture of bottom-up (micro-costing) and top down (gross) costing was used in the study. Input consumption data was collected using composite forms (Annex VII.I and VII.II) for both quality and cost assessment. Information sources were patient daily records, the patient him/herself, laboratory and ward staff. Research assistants checked every day at varied time intervals what was done to and for the patient. The form captured inputs used in managing the patient directly or indirectly (resource use). The inputs included number and type of laboratory tests carried out, number of chest x-rays taken, drugs administered (type, doses and period) including what was prescribed and provided at discharge, medical supplies provided (type and quantity), number of days in hospital, frequency of meals per day, and staff (doctors, nurses and general hands)–numbers and grade mix.

Unit prices obtained from the Government Medical Stores[44] were used to convert input quantities into costs. The calculation of staff time was not entirely bottom-up as for the majority of inputs. Staff time is usually spread over a number of activities: administrative, domestic, clinical and "idle time". Ideally, time distribution could have been captured by time and motion surveys. Instead, staff costs were calculated using average nursing, doctors' and general hands' full time equivalents per day, and the average number of inpatients in the ward. Equivalent salary costs per hour per staff category and the length of stay were used to calculate total staff costs per case. This approach may have overestimated staff time actually invested in managing a patient. The time requirement for two people to follow up at least five patients a day, and attempt to observe staff time use per patient exceeded researcher time available. Similarly, the cost of bedding and linen was computed as an average cost per day. That is, annual bedding and linen costs plus laundry costs divided by the annual number of patient days. The average cost per meal per day was calculated using total annual kitchen costs attributable to patients and the total number of inpatient days. Food costs per case were obtained by multiplying the average cost per meal per day by the number of meals per patient per day and by patient length of stay. In the case of all these costs, the hospital level cost estimates of Chapter 6 were improved on to the extent that ward level costs were computed, and the resource requirements of a truly bottom up approach exceeded those of the study.

Some of the laboratory cost data was obtained from a detailed costing study of laboratory services in Zimbabwe conducted by DANIDA in 1999 (unpublished). As a way of validating some of this data, a detailed costing of malaria tests (MPs), and TB sputum microscopy tests was carried out at Hospitals 4 and 6. With the assistance of a Laboratory Technologist estimates of technical ingredients for each test were established and costed. The results were cross-checked with the results of the DANIDA study and no significant differences were observed. Input quantities and purchase prices were essentially the same for public hospitals because of the central procurement system. The only possible source of differences between hospitals was in staff costs. In

[44] Government Medical Stores (GMS) is the central procurement and distribution unit for drugs and medical supplies for public facilities. Private sector suppliers are only used for products out of stock at

other words, the same test conducted by a laboratory technologist cost more compared to one done by a junior technician. In the end cost results for Hospital 4 and 6 were used for the other four hospitals. This approach had the risk of over or underestimating laboratory costs of other hospitals but because the cost contribution to patient costs was negligible, it was unlikely to have any notable effect on patient cost variations. The same was done for chest x-ray. The relevant inputs for an adult patient chest x-ray in hospital were costed with the help of the chief radiographer. These costs were small and I had to weigh the benefits against the costs of doing such detailed costing at each hospital.

Patient level costing did not include overhead costs (administration, utilities, etc.), not because there are not important but because the aim was to establish costs that vary with patient management activities. Overhead costs were adequately captured at hospital level (see Chapter 6). These could easily be incorporated but because I sought to understand how costs varied with patient care, their magnitude and the sources of this variation, they were purposefully omitted.

Data analysis

Each hospital and patient in the cohort had a unique code number. Patient specific data was organised according to these codes. Patient background characteristics such as age, sex, weight, referral status, case severity for malaria, length of hospital stay, results of laboratory tests and condition of patient at discharge were captured in SPSS files. Data on input consumption and unit prices were captured in EXCEL spreadsheets. Patient costs were then categorised according to major input categories, that is, staff, drug costs, medical supplies, and hotel services. Hotel services included bedding and linen, laundry services and food. Costs per case were calculated for the entire sample, and the two data sets were screened for outliers using cost per case as the key variable. Outliers were removed from the sample such that 197 malaria cases and 151 tuberculosis cases remained for further analysis. Sample data were trimmed because outliers distort the general distribution of data and ultimately statistics calculated therefrom

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GMS. In fact, GMS approves private procurement.

Costs per case were further broken down by case severity for malaria, and by hospital. In order to link patient costs and background variables, patient codes were used to combine the data sets. Statistical analysis involved descriptive statistics, cross tabulations and Pearson Chi-square for discrete variables, analysis of variance and F tests for continuous variables.

7.4 Results

The findings are presented in two parts for both malaria and pulmonary tuberculosis: (a) results of a pooled analysis and (b) a separate analysis for key cost variables by hospital. For malaria, cost results are further categorised by level of malaria complication or severity.

7.4.1 Malaria: Pooled Analysis

Of the 197 enlisted malaria patients, 53% (104) were referred cases and 47% (91) were self-referred cases. A figure of 47% of first contact malaria cases at tertiary hospitals reflects underlying problems associated with the hospital referral system. Allocative efficiency losses at hospital and system level are likely to occur under such circumstances. Fifty-three percent (105) of the patients were females and 47% (92) were males. Patient ages ranged from a year to eighty-four years, and the mean age was twenty-six years. The number of simple and complicated or severe malaria case was 83 (42%), and 114 (58%) respectively. Worth noting is that 52% (47) of the 91 self-referred cases were simple malaria cases further reflecting referral system problems[45]. The hospital case fatality rate was 17%, strikingly high compared to other diseases.

In order to validate the principal clinical diagnosis at admission, the results of malaria microscopy tests (MPs) were recorded for 154 cases. 76% (117) of the cases were

[45] At this level of analysis (pooled), malaria severity was not independent of referral status (F test, p=0.02)

positive and 24% (37) were negative. Some of the 37 negative cases could have been false negatives. Direct recurrent costs per admitted malaria case are shown in Table 7.1.

Table 7.1. Mean Cost Per Case of Malaria in ZW$ (N=197, FY1997/8)

Cost Category	Simple Malaria (n = 83)	Complicated Malaria (n = 114)	Malaria (n = 197)
Mean Cost per case	1,012 (100%)	1,905.49 (100%)	1,528.28 (100%)
Staff	294.60 (30%)	566.79 (30%)	452.11 (30%)
Diagnostic	41.48 (4%)	51.92 (3%)	47.57 (3%)
Drugs	23.38 (2%)	73.54 (4%)	49.67 (3%)
Medical supplies	0	51.93 (3%)	32.78 (2%)
Hotel services*	652.77 (64%)	1,161.31 (61%)	947.05 (62%)

Notes: * Hotel services include food, bedding and linen, and laundry services.

The general mean cost per case of malaria was ZW$1,528, and it ranged from ZW$143.96 to ZW$5,580. The median cost per case was ZW$1,254.72. The mean costs per simple and severe malaria case were ZW$1,012 (ZW$134.96-3,631.65) and ZW$1,905 (ZW$197-5,581) respectively. The median cost per case was ZW$718 for simple malaria and ZW$1,892 for severe malaria. Severe malaria cost almost twice as much as simple malaria. However, there were no differences in component costs per case, except for medical supplies costs, which were insignificant for simple malaria, and only 3% for severe malaria. The question of whether case severity explains differences in costs is discussed in the succeeding sections.

Hotel services are the major cost component (62%) of malaria costs per case followed by staff costs (30%). Patients invariably were provided three "balanced" meals a day (see Chapter 8), and this was costly. It was evident in the study hospitals that a significant proportion of retained fees was used to purchase food for patients and maintain hospital dietary standards. At the time of the study, a hospital equivalent meal (For example, "*Sadza*[46]" and stew) in the private sector cost about ZW$30-50. Using these prices, three meals a day in hospital cost about ZW$90-150. In addition, hospital

[46] Sadza is some form of hard porridge meal traditionally prepared with corn flour or any of the small grains like finder millet and rapoko. This meal is eaten at least once a day in Zimbabwe.

reforms introduced in the late 1990s advocated contracting out of non-core hospital services. Laundry services in the six hospitals were out-sourced, and this meant that hospitals were paying market prices (costs). All these factors explain why hospital stay (bed use) *per se* was a major contributor to overall cost per case. Hospital length of stay is a major concern for hospitals.

Average staff costs per case were probably overestimated because ward staff time is usually distributed across nursing care, domestic and administrative duties and idle time. This study assumed available staff time was used productively (no idle time). Drugs, diagnostic tests and other medical supplies contributed relatively little to the overall patient cost (10%). Antimalarials commonly used were chloroquine, fansider (pyrimethamine and sulphadoxine) and quinine. Drugs consumed per case are not substantial. For example, patient treatment could be three tablets of fansider in total which cost ZW$10.32/1000 tablets. Consequently the contribution of drug costs to total patient cost is likely to be small. The common test used for malaria was malaria parasite test (MPs) which costs ZW$32 per case. This explains why diagnostic costs were also a small proportion of cost per case.

The results show that inappropriate admissions can result in considerable resource wastage especially hotel services, and to some extent staff time. It is more expensive to treat a simple malaria case at tertiary level than at lower levels of the hospital system. The average cost per day for simple and severe malaria was estimated to be ZW$304 (ZW$82-617) and ZW$401 (ZW$162-977) respectively.

7.4.2 Malaria: Analysis by hospital

Analysis of cost per case of malaria by hospital provided an opportunity for an in-depth look at variations in unit costs across the sample hospitals. The underlying logic was that tracer costs would clarify variations or similarities in unit costs across hospitals. The existence of a national malaria treatment protocol might imply that the effect of clinical practice on variation in costs could be minimised although this depends on compliance. Background characteristics of malaria patients by hospital are shown in

Table 7.2. Hospitals 1 and 2 had high proportions of simple malaria cases, 73% and 59% respectively. All the hospitals except hospital 5 had high proportions (exceeding 50%) of self-referrals. Notably, hospital 5 had a high proportion of referred cases and severe cases (as expected of a tertiary hospital). Hospitals 4 and 3 had similarly high proportions of severe malaria cases and higher mean lengths of stay compared to hospitals 1 and 2. However, it is important to note that for all the five hospitals case severity was independent of referral status ($p>0.05$, X^2-Fisher's Exact test).

Table 7.2 Descriptive statistics of admitted malaria patients by hospital

Hospital/ Variable	[1] (n=56)	[2] (n=34)	[3] (n=47)	[4] (n=37)	[5] (n=23)	p-value
Mean patient age	22	25	34	22	30	NS
Patient sex:						
Female	31(55%)	13(38%)	23(49%)	16(43%)	22(96%)	
Male	25(45%)	21(62%)	24(51%)	21(57%)	1(4%)	<0.0001[1]
Simple malaria	41(73%)	20(59%)	8 (17%)	10(27%)	4(17%)	
Severe malaria	15(27%)	14(41%)	39(83%)	27(73%)	19(83%)	<0.0001[1]
Referral status:						
Referred	28(50%)	12(35%)	20(44%)	18(49%)	21(91%)	
Self-referred	28(50%)	22(65%)	25(56%)	19(51%)	2(9%)	<0.001[1]
Length of stay(days)	3	4	5	6	5	<0.001[2]
Mean LOS simple	2.9	3.2	3.4	5.0	4.8	<0.02[2]
Mean LOS severe	3.4	5	5.1	6.6	4.6	<0.03[2]
Case Fatality Rate	6 (11%)	6(17%)	8 (17%)	6 (16%)	5 (25%)	<0.001[1]
Lab. Results:						
Positive	27(48%)	18(55%)	45(98%)	8(32%)	19(86%)	
Negative	*	15(45%)	1(2%)	17(68%)	3(14%)	<0.0001[1]

Notes: * 27 cases were positive and results for 29 cases were not recorded, The same is true for 1 case for hospital 5, 7 for hospital 4 and 1 for hospital 3. 1 = Chi-square test, 2 = F test (ANOVA).

A greater proportion of patients were malaria positive[47] in all the hospitals especially hospital 3 with a 98% positivity rate ($p<0.001$). Although little can be said about the case fatality rate at this stage similar proportions of cases died across the hospitals

[47] Questions about the efficacy of malaria microscopy tests, and whether the patients actually had malaria or just parasitaemia is not relevant in this study. All cases that were clinically categorised by health staff as having malaria were considered as such and treated accordingly.

($p<0.001$). In all, there were significant differences in patient sex distribution, lengths of stay, patient referral status and case severity mix across the hospitals.

Hospital 1 had the lowest mean cost per case followed by hospital 2 (Table 7.3). Hospital 4 had the highest mean cost per malaria case—at least twice as much as that of hospital 1. Hospital 3 and hospital 5 had mean costs above the overall mean cost per case of ZW$1,528. Malaria cost per case results confirm hospital level cost analysis results (ranking) where hospital 1 and hospital 2 had consistently lower unit costs. The mean or median costs show a similar ranking of hospitals, and the range shows how individual mean costs per case varied in each hospital. Differences in case mix and consequently length of stay appear to be the most important explanatory factors.

Table 7.3. Cost per malaria case by hospital in ZW$ (1997/98)

Hospital	Mean	Median	Range
[1]	864.97	650.85	134.96-3,517.06
[2]	1,055.01	700.70	196.77-3,666.45
[3]	1,866.59	1,845.76	234.55-3,961.63
[4]	2,357.80	2,465.37	370.50-3,961.63
[5]	1,852.39	1,818.88	478.31-3,629.97

A breakdown of costs per case by input category shows that hotel services constitute a notable proportion of hospitalisation costs (Table 7.4). Hospital 2 was an exception with 50% of costs attributable to staff time and only 38% to hotel services. Low hotel services could be a reflection of poor quality of food and laundry services or efficiency in the provision of these services. Innovative and effective food and laundry services procurement systems could explain these low costs. Hospital 2 (just like hospital 1) is close to the capital city Harare (about 80 km) compared to other hospitals, and is located in a prosperous commercial farming area. Alternatively, the outlying proportions could be driven by high staff cost, which could be attributable to relatively higher staff numbers and grades. This issue is addressed at length in Chapter 8.

Table 7.4. Cost distribution, malaria (ZW$)

Hospital/ Cost Category	[1]	[2]	[3]	[4]	[5]	p-value
Staff	183 (21%)	532 (50%)	471 (25%)	700 (30%)	549 (30%)	NS
Diagnostic	29 (3%)	57 (5%)	46 (2%)	34 (1%)	103 (6%)	<0.001
Drug	30 (4%)	37 (4%)	48 (3%)	77 (3%)	74 (4%)	<0.01
Medical Sup.	15 (2%)	27 (3%)	38 (2%)	54 (2%)	40 (2%)	NS
Hotel Services	608 (70%)	401 (38%)	1263 (68%)	1497 (63%).	1088 (59%)	<0.001
Total	865 (100%)	1055 (100%)	1866 (100%)	2363(100%)	1852 (100%)	

There were significant differences in the proportions of hotel services costs ($p<0.001$), drug costs ($p<0.01$) and diagnostic costs ($p<0.001$) across the hospitals implying that hospitals employed different resource use strategies (or input mix) in the production of hospital care for malaria cases. However, all the hospitals (except hospital 2) had similar proportions of staff costs and this could be attributable to similarities in staffing patterns (not necessarily staff time use patterns) in malaria management at these hospitals. Staffing levels and patterns are reviewed in succeeding chapters.

Hospital ranking does not change when cost per case results are dichotomised by case severity—simple and severe malaria (Table 7.5). Hospital 1 and hospital 2 maintain their positions in the group with lower unit costs compared to the other three hospitals. This implies that their low cost is not wholly explained by lesser case severity. The cost per simple case of malaria is oddly high for hospital 5. This may be due to a relatively small sample size of four simple malaria cases, which is likely to be unrepresentative. Apart from that, Hospital 4 maintains its position in the group as the most costly per hospitalised malaria case. The mean cost per simple malaria case is significantly less than the mean cost per severe malaria case. In some instances, is the difference is almost twofold (hospital 1 and 2). This is explained by significant differences in the mean length of stay by severity across the hospitals (Table 7.2).

Table 7.5. Mean cost per case for severe and simple malaria (ZW$)

Mean Cost/Hospital	[1]	[2]	[3]	[4]	[5]
simple malaria	693	769	1317	1970	2498*
(Range)	(135-2725)	(238-1930)	(327-2692)	(371-3631)	(1879-3087)
	n = 41	n =20	n = 8	n = 10	n = 4
Severe malaria	1,336	1524	1936	2501	1716
(Range)	(314-3517)	(253-3666)	(197-5580)	(458-3962)	(478-3630)
	n = 15	n = 14	n = 39	n = 27	n = 19

Notes: * Hospital 5 had 4 simple malaria cases, and therefore the figure is suspect.

There seems to be no significant difference in the distribution of component costs per case between severe and simple malaria, and between total malaria and each of the severity categories (Table 7.6 and Table 7.7). Differences in cost levels can be observed in diagnostic and drugs cost categories between severe and simple malaria. Otherwise resource use patterns appear to be fundamentally similar and overall cost differences are determined by length of stay.

Table 7.6. Cost distribution, simple malaria (ZW$)

Cost Category	Hospital [1]	Hospital [2]	Hospital [3]	Hospital [4]	Hospital [5]
Staff	153 (22%)	350 (45%)	368 (28%)	593 (30%)	574 (23%)
Diagnostics	28 (4%)	60 (8%)	32 (2%)	32 (2%)	131 (5%)
Drugs	27 (4%)	26 (3%)	6 (0.4%)	17 (1%)	28 (1%)
Hotel services	485 (70%)	334 (43%)	911 (69%)	1328 (67%)	1764 (71%)
Total	693 (100%)	769 (100%)	1317 (100%)	1970 (100%)	2498 (100%)

Table 7.7. Cost distribution, severe malaria (ZW$)

Cost Category	Hospital [1]	Hospital [2]	Hospital [3]	Hospital [4]	Hospital [5]
Staff	263 (20%)	824 (54%)	483 (25%)	740 (30%)	543 (32%)
Diagnostics	32 (2%)	55 (4%)	48 (2%)	35 (1%)	97 (6%)
Drugs	63 (5%)	67 (4%)	56 (3%)	100 (4%)	83 (5%)
Med.Supplies	34 (3%)	58 (4%)	44 (2%)	72 (3%)	48 (3%)
Hotel services	943 (70%)	520 (34%)	1305 (67%)	1560 (62%)	945 (55%)
Total	1335 (100%)	1524 (100%)	1936 (100%)	2508 (100%)	1716 (100%)

The costs per day for malaria by hospital are shown in Table 7.8. Hospitals 1 and 2 have lower average cost per day despite their similar lengths of stay to other hospitals. Utilisation levels cannot explain this cost variation either because the medical wards of hospitals 5 and 1 are characterised by high BOR and BTR (see Chapter 5) but they have the highest and the least average cost per day respectively. These results seem to suggest differences in either severity mix and/or institutional factors, for example, resource endowment, quality and clinical practice, may explain the observed cost variations.

Table 7.8. Average cost per day per malaria case by hospital (ZW$), 1997/98

Hospital	Average cost per day	Range
1	292	82-735
2	337	74-1273
3	379	197-583
4	402	185-804
5	481	120-1333

When mean costs per day are considered for simple malaria cases, no apparent difference in hospital ranking is observed. Hospitals 1 and 2 continue to have lower costs and hospital 4 and 5 high costs (Table 7.9). However, there are significant differences in the mean cost across hospitals ($p<0.001$). The cost component distribution pattern is similar to what was observed for cost per case. Hotel and staff costs are the major cost components.

Table 7.9. Cost distribution of mean cost per day for simple malaria in ZW$, 1997/98

Hospital/Cost category	1	2	3	4	5
Staff	57 (22%)	117 (43%)	116 (30%)	123 (32%)	117 (22%)
Diagnostics	13 (5%)	27 (10%)	13 (3%)	8 (2%)	19 (3%)
Drugs	13 (5%)	11 (4%)	2 (1%)	4 (1%)	7 (1%)
Hotel services	181 (69%)	117 (43%)	260 (67%)	250 (65%)	399 (73%)
Cost per day	264 (100%)	272 (100%)	390 (100%)	385 (100%)	543 (100%)

The cost profile for patients who had severe malaria is shown in Table 7.10. As expected, the costs per day are higher than the cost per simple malaria case (Table 7.9). Noticeable differences in drug costs, hotel and diagnostic costs can be seen between simple and severe malaria cases. Observed small differences in staff costs between severe and simple malaria cases are explained by the method used in the calculation of staff costs which did not specifically consider time spent per patient. It would be expected that more time is spent per severe case given the extra nursing time and intensive treatment they normally require. Nonetheless, severe malaria had generally higher costs per component cost across hospitals. What is interesting is that there was no significant difference between the cost per day for severe malaria across the hospitals ($p>0.05$). This was also true for simple malaria cases which seems to suggest that case severity was not a major factor in explaining malaria cost per day differences across hospitals. Assuming similar institutional practices amongst the hospitals, the most likely factor driving the cost differences was length of stay.

Table 7.10. Cost distribution of mean cost per day for severe malaria in ZW$

Hospital/Cost category	1	2	3	4	5
Staff	74 (20%)	197 (53%)	98 (25%)	116 (28%)	127 (28%)
Diagnostics	13 (3%)	14 (4%)	15 (4%)	7 (2%)	24 (5%)
Drugs	29 (8%)	16 (4%)	17 (4%)	17 (4%)	24 (5%)
Med. Supp. & other drugs*	21 (5%)	14 (4%)	13 (3%)	13 (3%)	14 (3%)
Hotel services	248 (65%)	127 (35%)	241 (63%)	258 (63%)	257 (58%)
Cost per day	383 (100%)	368 (100%)	385 (100%)	411 (100%)	446 (100%)

Notes: * Other drugs include drugs that are not antimalarials.

7.4.3 Tuberculosis: Pooled Analysis

Tuberculosis patients were not classified by level of illness severity, and the results presented here are based on a total sample of 151 admitted patients (WHO Category I cases). A fairly high proportion of TB cases (55%) was self-referred, and 45% were referred. It is not clear why more TB cases self-referred. One intuitive explanation is that people perceive tertiary level institutions to be better equipped and staffed to diagnose and treat tuberculosis properly. The mean age of patients was 32 years (ranged from 1 to 78 years). Out of the 151 cases, 64 (43%) were females and 85 (57%) were males. Hospital 3 was atypical in the group in that all patients diagnosed pulmonary TB positive, were referred to a nearby infectious disease hospital. This meant shorter lengths of stay and hence lower costs per case. Costs results are presented separately, including and excluding Hospital 3, to correct for its distortionary effect on the overall mean cost.

The mean cost per tuberculosis case reflects all of the direct costs incurred by patients admitted for the first time with smear positive TB (or indicative x-ray results), for their intensive phase treatment (Category 1[48]). The mean and median cost per TB case, including Hospital 3, were ZW$2,057 and ZW$1, 666 respectively (Table 7.11). After excluding Hospital 3, the mean and median cost per TB case were ZW$2,203 and ZW$1,831 respectively. The distribution of component costs per case remains the same. Hotel services and staff costs were the major contributors to patient costs. The proportions are similar to those found for malaria. Drugs and medical supplies constitute a small proportion of mean case costs. At the time of the study, hospitals had adopted the directly observed treatment approach[49] (DOTS), and patients were kept for lesser periods in hospital before discharge for home or local clinic treatment. In hospitals 5 and 3 patients were transferred to a specialist infectious disease hospital immediately after they were diagnosed TB positive. This meant that the hospital costs incurred whilst waiting for laboratory results were largely amenity costs, staff costs and initial doses of TB drugs.

Table 7.11 Mean Cost Per TB case, Provincial Hospitals in ZW$ (n=151, FY1997/8)

Cost Category	All Hospitals[1] (n=125)	Range	All Hospitals[2] (n=151)	Range
Cost per case	2,203 (100%)	340 – 6,010	2,057 (100%)	340 – 6,010
Staff costs	738 (34%)	66 – 3115	669 (32%)	18 – 3115
Diagnostic costs	130 (6%)	0 – 192*	132 (6%)	5 – 39
Drugs & Med. Supp.	17 (1%)	1 – 140	15 (1%)	5 – 101
Hotel services	1,317 (60%)	58 – 4,419	1,247 (61%)	58 – 4,419

Notes: 1 excludes and 2 includes hospital 3. * 0 means that no test was done

[48] Such patients are classified as Category I patients according to the National TB treatment Guideline. These are cases with pulmonary TB, admitted for the first time with TB and with no evidence of resistance to TB drugs (MOH, 1994).

[49] To reduce congestion in hospitals, and to contain hospital costs, TB patients are kept in hospital for a shorter period of time (1-2 weeks) during intensive phase of treatment compared to the conventional 2 months in hospital. Once patients are stabilised, they are discharged for continued home treatment. What is important is that someone close to the patient (relative or Village Health Worker) is trained to directly observe the patient taking medication at prescribed times. Direct observation improves treatment compliance and treatment success rate (MOH,1998).

The mean length of stay in hospital was seven days. Patients could be admitted for one to 32 days. The length of stay was greatly influenced by case severity, clinical practice and whether or not there was a specialised infectious disease hospital nearby.

7.4.4 Tuberculosis: Analysis by hospital

Tuberculosis patient characteristics were generally similar across the study hospitals. Hospital 4 had the highest proportion of self-referred cases (69%) a similar scenario was observed for malaria cases (Table 7.12). For the remaining hospitals, the majority of TB cases were referred. Hospital 6 had the highest mean length of stay of 10 days followed by hospital 4 with 9 days. Hospital deaths due to TB ranged from 8-19% (excludes home deaths). These short stays can be explained by the implementation of DOTs, and home based care programmes.

Table 7.12 Background characteristics for TB patients by hospital (n=151).

Hospital/ Variable	[1] (n=30)	[2] (n=37)	[3] (n=26)	[4] (n=32)	[6] (n=26)	p-value
Mean patient age	33	33	33	30	38	
Patient sex:						
Female	17 (57%)	12 (33%)	11 (42%)	13 (42%)	11 (42%)	
Male	13 (43%)	24 (67%)	15 (58%)	18 (58%)	15 (58%)	NS
Referral status:						
Referred	16 (53%)	19 (51%)	17 (65%)	10 (31%)	19 (76%)	
Self-referred	14 (47%)	18 (49%)	9 (35%)	22 (69%)	6 (24%)	<0.01
Length of stay(days)	5	6	4	9	10	<0.001
Case Fatality Rate	4 (13%)	3 (8%)	5 (19%)	5 (16%)	2 (8%)	<0.001

Patient profile by sex in the cohort was similar. There were significant differences in the average length of stay ($p<0.001$), referral status of patients ($p<0.01$) and hospital deaths due to TB ($p<0.001$) across the hospitals. Similar results were obtained for malaria.

Table 7.13 shows the cost per case of tuberculosis by hospital. Hospital 6 had the highest cost per case with costs ranging from ZW$1,315 to ZW$6,010. This is linked to its relatively longer length of stay (10 days), and low bed turnover rate (see Chapter 5). For hospital 1 and 2 the scenario is similar to that of malaria, they had the least cost per case. Hospitals 4 and 3 had intermediate costs. All these results were in line with the predictions of the Pabon Lasso method. The wide ranges in cost per case for all the hospitals can be explained by differences in case severity and length of stay.

Table 7.13. Cost per tuberculosis case by hospital in ZW$ (1997/98)

Hospital	Mean	Median	Range
1	1,532	1,249	454-4,546
2	1,462	1,305	340-3,842
3	1,358	1,075	392-3,673
4	2,695	2,566	515-5,752
6	3,425	3,000	1,315-6,010

A decomposition of the mean cost per TB case shows that the input cost pattern is similar across hospitals (Table 7.14). Drug costs are particularly low because most patients had short stays in hospitals (beginning of intensive phase treatment). In interpreting these results it is important to realise the difference between drug costs for an episode of TB, and drug costs during hospitalisation. The former is likely to be higher than the latter.

Table 7.14. Distribution of mean cost per TB case in ZW$, Provincial Hospitals, 1997/98

Cost Category	Hospital [1]	Hospital [2]	Hospital [3]	Hospital [4]	Hospital [6]	p-value
Staff	298 (19%)	638 (44%)	321 (24%)	632 (23%)	1520 (44%)	<0.001
Diagnostic	148 (10%	159 (11%)	139 (10%)	93 (3%)	115 (3.4%)	<0.001
Drug	10 (1%)	10 (1%)	6 (0.5%)	13 (0.5%)	22 (0.6%	<0.001
Medical Sup.	0.12 (0%)	6 (0%)	0.6 (0%)	2 (0%)	6 (0%)	<0.05
Hotel Services	1076 (70%)	684 (44%)	891 (66%)	1955 (73%)	1762 (51%)	<0.001
Total	1532(100%)	1462 (100%)	1358 (100%)	2695 (100%)	3425 (100%)	

Staff and hotel services constitute the greater part of costs per hospitalised TB patient. Diagnostic costs were relatively high compared to similar costs for malaria. Common tests conducted for TB were: three sputum microscopy tests at admission, a chest x-ray, full blood count, and Erythrocyte Sedimentation Rate (ESR). Diagnostic costs were low in Hospital 4, where frequent shortages of reagents and breakdown of equipment occurred. For a period of five months no laboratory tests for TB were carried out in 1998 (personal communication with the Chief Laboratory Technologist). For Hospital 6 diagnosis for TB was mainly through sputum microscopy and chest x-rays. There was much less intensity in laboratory investigations. This explains differences in diagnostic costs across hospitals.

The average cost per day for tuberculosis showed a similar variation pattern across hospitals as for malaria (Table 7.15). Hospitals 1 and 4 had the least cost per day whilst hospital 6 had the highest cost per day. This can be explained by differences in length of stay. Wide ranges in the average cost per day are explained by wide variations in length of stay and diagnostic intensity. The median average cost per day values depicts this variation to some extent.

Table 7.15. Average cost per day for TB by hospital in ZW$ (1997/98)

Hospital	Mean	Median	Range
1	320	314	271 – 453
2	238	220	164 – 422
4	385	389	157 – 515
6	378	379	164 – 489

7.5 Summary of findings

This part of the study attempted to measure in detail the costs of hospital services using malaria and pulmonary tuberculosis as tracers. It examined patient and hospital characteristics that impinge on hospital costs, differences in input mix and variations in mean cost per case and per day. Tracer diseases allowed for detailed examination of costs of hospital services, a clearer understanding of cost categories and relative efficiencies by ward and hospital.

The main recurrent cost components per case (admission) were hotel services (44-70%) followed by staff costs (20-44%). Drug costs and medical supplies constituted 10%. This means that hospitalised cases incurred significant costs whether treatment was given or not.

A comparison of mean costs per malaria patient across hospital showed that hospital 1 had the least costs followed by hospital 2. Hospitals 4 and 6 had high costs per case probably due to relatively longer lengths of stay and high proportion of severe cases. Hospitals 3 and 5 had intermediate costs.

Hospital 3 had the lowest cost per TB case treated because of its non-admission policy for confirmed TB positive cases. This resulted in atypically short lengths of stay. The pattern of cost variation between the hospitals was similar to that observed for malaria where hospitals 1 and 2 had lower costs compared to the rest. Hospital 6 had the highest cost per tuberculosis case treated.

The ranking of hospital "costliness" by tracer disease dovetails well with the rankings using average costs at ward and hospital level. This suggests that the tracers are likely to have succeeded in representing the behaviour of the hospital as a whole, and that hospital level data comparisons are not likely to be seriously confounded by case mix differences (although other explanations are theoretically possible). What could not be said at this stage, was whether or not these cost differences reflected efficiency or poor quality of services.

CHAPTER 8 QUALITY OF HOSPITAL SERVICES

8.0. Introduction

The difficulties of measuring quality of health services correspond to those of defining it. The measurement method used is a function of how quality is defined. Secondly, it is influenced by what is feasible given the prevailing circumstances. This study sought to define and measure quality in a manner that was both sensitive to the context, and capable of exposing vulnerable areas for improvement.

Many have grappled with the conceptualisation and operationalization of quality of care concepts (Donabedian 1966, 1980, Shortbridge 1974, Amonoo-Lartson 1981, Black 1990, Bitran 1995). There appears to be no consensus on a universal definition of quality, owing to differences in opinion, its complex multifaceted nature and different purposes for seeking a definition. How comprehensive can one be in defining quality? Attempts to be comprehensive have often led to quality definitions that are difficult to measure in practice. The study adopted the Institute of Medicine (1990) definition that: " Quality of care is the degree to which health services for individuals and populations increase the likelihood of desired outcomes and are consistent with current professional knowledge". Shortbridge (1974) argues that:

> "As long as the researcher can define the aspects of care which he is studying and describe the means used to measure them there is no drawback, for each reader can then evaluate for himself their centrality to his concept of care, and the appropriateness of the measurement process."

The application of the structure-process-outcome paradigm (Donabedian 1980) permits quality judgement at different stages in the production of medical services. Each aspect of the triad is explained in the context of the other (Donabedian 1988, Wyszewianski 1988). Knowledge of the relationship between structure and process is limited, but much is known about the relationship between process and outcome (Mates et al., 1981, Donabedian 1988). Most quality assessment studies in LMICs have tended to focus on structural and process aspects of quality (De Geyndt 1995, Gilson 1992) because of the twin problem of data unavailability and quality. Furthermore, these studies have relied mostly on retrospective data and patient satisfaction surveys. Little attention has been given to assessing the quality of inpatient services, and even less so using prospective approaches. This study attempted to correct for data deficiencies in estimating quality of inpatient services by using prospective patient-specific methods.

Quality analysis used a tracer approach (Kessner 1972) as used for cost analysis, and discussed in Chapter 7. The use of tracer diseases in combination with explicit management criteria may provide an understanding for improving hospital services quality. Numerous approaches are used in setting explicit criteria: review of literature, panel of experts, and use of consensus building methods like the Delphi technique (Payne et al., 1984, Mates et al., 1981). When using a panel of experts, it is important to ensure that the panel represents the constituency subject to assessment (Donabedian 1988). It appears ambitious, if not pointless; to use specialists who are accustomed to working in well-resourced institutions to define quality standards for poorly endowed district hospitals, for example. The two main demerits of explicit criteria design are lack of adaptability to patient characteristics, and problems with relative values of different criteria in relation to expected outcome. The latter can be addressed by using weighting systems (discussed later). The former relates to the restrictive nature of explicit protocols in tailoring patient management to specific conditions for the patient. For instance, patients have different allergies to different drugs. Explicit criteria attenuate the advantages of clinical autonomy.

Comparisons of quality performance require some form of measurement scale. There are broadly two types of scales: (1) categorisation of care into qualitative divisions such as "excellent," "good," "fair," or "poor." Percentages of cases that fall in each category are calculated for comparisons or rankings; (2) use of scores for specified aspects of care. Scores are quantitative measures assigned to specified components of care that can be weighted to reflect the relative importance of each factor to the total quality score or index. Assignment of scores and weights is done through a panel of experts or literature review. Different providers are then ranked according to the scores, and also against an expected yardstick quality score (Montoya-Aguilar 1994). For example, a Provider Performance Index (PPI) calculated using scores was successfully used to assess provider behaviour, and the relationship between process and outcome of care (Mates et al 1981, Payne et al., 1984). Numerical scores give a picture of various components of quality which can be hidden if scales of "good" or "bad" are used, for example.

However, the use of numerical scores faces two major challenges; (1) in some instances, medical care has an all-none aspect which numerical scores usually do not reflect. Care can be good in many aspects and be disastrously inadequate on the whole due to a vital error in one component. It is argued that this is not a problem if there is demonstrated interrelationship between the different components (Donabedian 1966); and (2) the manner in which different components are weighted to arrive at a total score remains subjective. The problem relates to the value of different items or procedures in the management process. In most cases a panel of experts decide on weights to be used. There are problems related to the interpretation of the numerical interval between points on a scale. Donabedian (1966) argues that it is unlikely that numerical scores derived for the quality assessment have the property of equal intervals. This implies that it is inappropriate to calculate mean scores, or perform any other arithmetic manipulation, and this view is therefore inconsistent with drawing institutional level inferences from the data. Uses of this approach tend (as here) to disregard this view. In this study, a panel of experts assisted in designing the weighting system, and its credibility should be judged on that basis.

In this chapter two main objectives are pursued. First, to assess the quality of inpatient services at two levels: hospital level structural quality assessment, and patient level assessment using tracer diseases. Second, to explore the extent to which disease or patient-specific quality assessment can provide insights into the overall quality of inpatient services.

The chapter is organised as follows. Section 8.1 presents the methodology used in quality assessment at both hospital and tracer level. Results on hospital level quality assessment are presented in section 8.2.1, and this is followed by the results on tracer quality assessments in section 8.2.2. The chapter ends with a brief discussion and summary of the results in section 8.3.

8.1 Methods

8.1.1 Hospital level analysis

At hospital level, four dimensions of structural quality were measured in the study: hospital financial resources, staff, availability of drugs, and condition of buildings. Each is discussed in turn.

Financial resources: Data on available financial resources were collected as part of hospital cost analysis (see Chapter 6), and included government allocations plus any donations in the financial year 1997/98. In-kind donations were converted into equivalent dollar amounts using prevailing market prices. Only financial resources to support recurrent hospital activities are considered in this chapter.

Staff: An inventory of staff levels by category, grade and department was carried out at each hospital. Collected data were verified with audited hospital staff reports for the financial year 1997/98 as a way of exploring staff attrition, and movements within the hospital. The staff list provided a cross-sectional view of the staffing situation for the year under review. Comparisons were made between the actual staffing situation and expected standards. The study used minimum staffing standards obtained from a recent human resource study report for the MOH&CW (Initiatives Incorporation, Boston, 1999). Worth pointing out is that the calculation of standards was based on the need to deliver core health services at minimum acceptable levels of quality. The following quotation summarises how this was done:

> "Definition of the minimum staffing standards was derived from an assessment of staffing standards currently in force at existing health facilities/programmes; from consultations with heads of professions regarding the future roles of their profession, the constraints facing their delivery of acceptable standards of service; and their perceptions of standards required to deliver a minimum quality of service. .....Minimum staffing standards were also derived from workload and population based measures" (Initiatives Incorporation, Boston, 1999).

In making comparisons with the norms, appropriate adjustments were made for differences in bed size. Adjustments were necessary since the calculation of norms was based on a 200-bed tertiary hospital with mean bed occupancy rate of 71%. In addition, available staff time was calculated using a 204-day working year after subtracting 57 vacation days. This might have caused some overestimation of available staff time since sick and study leave days were excluded. Exclusion of these days was prompted by the quality of records available, which were not amenable to systematic review. Acute shortages of staff meant that most people did not take leave and opted for cash-in-lieu of leave instead. Workload statistics for 1997/98 FY were used to calculate workload-based staff ratios.

Drugs: Availability of drugs is a good indicator of structural quality especially in resource constrained contexts. A standard checklist of essential drugs and medical supplies at tertiary level was developed at one of the hospitals (Hospital 4) with technical assistance from the pharmacist. The list evolved from a basic question: Which drugs are indispensable at this level of care? Drug selection used two criteria: (1) drug category according to the Essential Drug List of Zimbabwe (EDLIZ 1994). Tertiary hospitals can dispense drugs in categories A (primary facilities), B (secondary hospitals), and C (tertiary hospitals), and (2) utilisation levels. It was intended to select those drugs that could reflect the dynamic relationship between demand and supply of services. Therefore, the drugs selected could belong to any category. If the most needed drugs were not available most of the time then the capacity of the hospital to provide quality of services was questionable. The list was not exhaustive but it provided a sample view of the availability of an important input in patient hospitalisation. A list of 33 items was drawn up (Annex III). Using this list, pharmacy stock cards for each listed drug for the period July 1997 and June 1998 were retrieved. From these cards, data was abstracted on frequency of stock outs by item, and the period each drug was out-of stock. The limitation of using this approach was that the drug list developed might have biased the results because it was based on one reference hospital probably facing a unique disease and utilisation profile. Also, most of the drugs chosen were not exclusively for tertiary care. Nonetheless, selected drugs reflected current utilisation patterns (need), which the study sought to investigate. Similar data could not be obtained from hospitals 3 and 2 because of physical constraints (uncooperative pharmacists).

Buildings: A number of criteria were used to assess and compare the quality of hospital buildings. These included: (a) availability of space as shown by presence or absence of floor beds and isolation wards, proximity of hospital beds, separate staff duty rooms, (b) whether or not the building was ventilated as shown by "stuffiness", presence or absence of working ventilators, (c) roof leaks as shown by spoiled ceilings, or presence or absence of holes, and (d) adequacy of lighting. Each hospital department was visited and assessed (through observations) during the course of the study and in addition, heads of departments were asked to comment on the condition of their physical-working environment.

8.1.2 Patient level analysis

The same arguments advanced for use of tracer conditions in costing (see Chapter 7) apply for quality analysis. The basic hypothesis was that it is possible to review in greater detail both structural and process aspects of quality of inpatient services using tracer conditions. The same tracer conditions and patients used for micro-costing were used for quality assessment. Case recruitment is described in Chapter 7. A total of 135 cases of pulmonary tuberculosis, 98 simple malaria and 104 severe malaria cases were used in the analysis. Tuberculosis data from hospitals 3 and 5 were excluded in the analysis: hospital 3 because its policy was to refer all cases diagnosed with TB to a nearby infectious disease hospital. Suspected TB patients were admitted for presumptive treatment and/or investigative purposes only. Hospital 5 data quality was poor, and just like hospital 3, it referred all confirmed cases to an infectious disease hospital. These data could have affected the results considerably. However, some results for hospital 3 are presented separately for illustrative purposes.

Explicit normative quality criteria for the selected diagnostic groups were developed from the respective national management guidelines with the guidance of a selected panel of experts (see Chapter 7). The national guidelines formed the core upon which other clinically relevant but non-clinical process and structural factors were added (Annexes VII.I and VII.II). The criteria included diagnostic, therapeutic management, patient and environmental hygiene, documentation and nursing variables. Each quality component was assigned a score weighted according to its relative importance in increasing the likelihood of the desired positive outcome. The value attached to each variable was naturally dependent upon panellists' consensus perceptions and experiences. In the end quality cluster categories for pulmonary tuberculosis had these cluster (or group) weightings—structural factors (56%) and process factors (44%). Simple and severe malaria had structure and process weightings of 32% and 68%, and 28% and 72% respectively (Table A8.1). Process aspects of quality assessed were entirely patient-specific. Organisational and policy related process factors were excluded not because there are not important but because of some physical constraints.

For each study site, two research assistants (health accountants) with nursing experience were recruited for patient recruitment and follow-up. The first two days were devoted to training of research assistants in the application of the explicit criteria followed by trial runs on at least two inpatient cases each. This was essential for standardising data abstraction and ratings. Continuous consultations between the research assistants, and the principal investigator on data collection were held as much as possible as a data quality control strategy. Patients were recruited from the outpatient and casualty departments. Once recruited, they were visited every day, and as and when necessitated by critical moments in their treatment process. Data was captured from patient charts and interviews (where possible), and ward staff (on non-sensitive aspects or verification of patient records). The Hawthorne effect was not likely to be pronounced because data collection did not involve observation of the actual treatment, for instance, giving an injection, but involved checking (through records and patient interviews) at timely intervals whether the injection was given or not. In the last three years hospitals in Zimbabwe introduced public relations officers whose role, *inter alia*, was patient welfare. These cadres regularly interviewed patients at random in the hospital, and therefore it was not unusual for hospital staff to see their patients being interviewed during the study.

8.1.3 Data Analysis

At hospital level, staff availability was measured in terms of staff numbers and grades. Workload related staff ratios were calculated using activity statistics for 1997/98. Existing staffing levels were compared to expected national norms. For drugs, the frequency of drugs stock outs and period of stock outs was calculated, and rated on a "satisfactory/unsatisfactory" scale. Descriptive statistics were accordingly calculated. Available recurrent resources per bed were computed by hospital.

At patient level, a number of systematic steps were taken. Data were coded by hospital and by patient and entered into the computer using SPSS software. A total of 37 factors (or variables) for TB, 42 for simple malaria and 39 for severe malaria were created, and each entry, except for non-background variables represented a weighted score. A mean score was computed for each case by considering the number of applicable variables to each case. This meant that a case was judged by the variables applicable to it. For example, if a patient was not comatose, it was not necessary to refer her to the coma scale. A lower score would not be applicable in that case. Using these mean scores, a global mean score inclusive of both structural and process factors, a mean structural score and a mean process score were computed by hospital. These hospital scores were compared across hospitals, and to the expected minimum[50] mean scores. The expected scores were calculated using maximum scores for each applicable factor for each tracer. By calculating sub-category or cluster scores it was possible to examine which factors influenced the global score. Statistical analyses were done to test for significant differences amongst hospitals.

[50] Note the difference between minimum quality scores which reflect achievable standards given the constraints, and optimal scores which reflect desirable standards beyond minimum standards which require more dedication and determination to achieve (Heidemann 1993).

8.2 Results

8.2.1 Hospital level analysis

8.2.1.1 Financial resources

The level and to some extent the scope of health service provision is usually determined by availability of financial resources. In other words hospital resource endowment can influence both the quantity, and quality of services hospitals can provide. Table 8.1 shows nonsalary financial resources that were available to the six hospitals in the 1997/98 financial year. Hospitals 1 and 2 had the least resources per bed whilst hospital 5 had the most.

Table 8.1 Availability of non-salary recurrent financial resources in ZW$, 1997/98 FY

Hospital	1	2	3	4	5	6
Recurrent funds	11,049,087	10,286,549	18,737,154	21,199,599	23,045,891	14,500,699
Number of beds	171	160	250	235	223	156
ZW$ per bed	64,615	64,291	74,949	90,211	103,345	92,953

Hospitals 4, 5 and 6 were better endowed financially to potentially provide greater quantities and better quality of services than hospitals 1, 2 and 3. A caveat to this interpretation is that public hospitals usually do not decide on quantity targets of services (externally driven) but provide as much as available resources permit them. Therefore the probability of delivering quality services is influenced by many other factors.

8.2.1.2 Staff

Staff availability needs to be interpreted in terms of the role of tertiary hospitals in the referral chain. Tertiary hospitals are expected to be appropriately equipped and staffed to provide specialist and intensive care to referred patients, who are supposedly severely ill and/or have complications. In Zimbabwe, the situation is odd in that provincial hospitals also have a secondary function[51] for their immediate surrounding population. These hospitals are located in urban administrative districts, and are the referral hospitals in those towns.

Table 8.2 shows staff availability by category at the study hospitals compared to expected levels sufficient to provide minimum acceptable services[52]. Much variation in staff availability can be observed in the clinical and medical staff category (doctors and nurses), and less so in the medico-technical (laboratory, pharmacy, rehabilitation and dietetics), administrative and ancillary categories (See Table A8.2 and A8.3). Hospitals 5 and 3 had at least four specialists to provide specialist care and support to general medical officers. Hospital 6 had two resident specialists whilst hospitals 4 and 2 had none. Hospital 1 had one specialist ophthalmologist. Clearly, this lack of specialists undermined the hospitals' capacity to adequately fulfil their role as referral centres for secondary hospitals. This implies that some patients were unnecessarily referred to higher levels of care, resulting in system inefficiencies.

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[51] A tertiary hospital serves an average of eight districts, including the urban district. This means that about 13% of its services, excluding self-referrals, are justified secondary functions. However, the distinction is not clear.

[52] To interpret Table 8.2 look at the frequency of +++, ++, + and - per hospital, and across hospitals.
+ measures the degree of proximity to the norm.

Table 8.2. Rating of Staff Availability by Category, Tertiary hospitals 1997

Staff Category	[1] (171 beds)	[2] (160 beds)	[3] (250 beds)	[4] (235 beds)	[5] (223 beds)	[6] (156 beds)	**Norm[a] (200 beds)**
a) Medical							
Specialists	+	-	++	-	+++	+	**7**
GMOs	++	++	++	++	+++	++	**10**
Med. Sup.	+++	+++	+++	+++	+++	+++	**1**
RGN/SCN	+	++	+++	++	++	+	**293**
Pharmacist	+++	+++	+++	++	++	++	**2**
Pharmacist Tech.	+	++	+	++	++	++	**5**
Matrons	++	++	+++	-	+++	+++	**2**
b) Medico-tech.							
Therapists	+	++	++	++	++	+	**6**
Orthopaed. Tech	-	-	-	-	+++	-	**1**
Rehab. Tech.	++	+++	+++	++	+++	+++	**4**
Lab.Technologist	+	+	++	+	+++	+	**6**
Dietician	-	-	-	-	-	-	**1**
Radiographer	++	++	++	++	++	++	**5**
X-Ray Operator	+++	-	-	-	-	+++	**2**
Clin.Pyschologist	-	-	-	-	-	-	**2**
c) Administ'ive							
Med. So. Worker	-	+	+	-	-	-	**2**
Inst. Dom.Super.	++	++	++	++	++	++	**4**
Hosp.Admin[b]	+++	+++	+++	+++	+++	+++	**3**
Clerical & Secre	++	++	++	++	++	+	**21**
Ancillary[c]	++	++	+++	++	+++	++	**95**

Notes: [a] Workload based minimum staffing standards for clinical care facilities. Calculated using an average hospital with 200 beds, and 71% bed occupancy rate.
[b] Includes the hospital administrator, senior executive officers, and executive officers
[c] Includes drivers, X-ray attendant, domestic supervisors, equipment technician, nurse aids and general hands.
+++ means 100% of required posts occupied, ++ means at least 50%, + means less than 50%, and – means 100% vacancy rate.

All the hospitals had at least 50% of general doctor requirements. Hospitals 3 and 5 had eight and nine GMOs out of the required ten respectively. Hospital 6 had the least with five GMOs. Hospitals 1, 2 and 6 had low nurse numbers compared to the norm even after adjusting for their size[53]. Hospital 3 had a relatively high contingent of nursing staff with 95% of expected nurses in post. There is general similarity in staffing patterns for the medico-technical and ancillary departments across hospitals. However, considerable differences in medical staff categories (doctors and nurses) exist. Hospitals 1, 4 and 6 were relatively short staffed with 50%, 43%, and 43% of their medical, and

[53] For instance, hospital 1 needed (171/200) x 293 nurses at the minimum compared to 110 available.

medico-technical establishment posts less than 50% filled respectively[54]. Hospitals 5, 3 and 2 had 86%, 71% and 64% of similar established posts occupied respectively.

Assessment of staff availability provides information about staffing levels but not about adequacy of staff given hospital workload. A comparison of staffing levels using workload data is shown in Table 8.3. It is clear that there is shortage of staff across hospitals.

Table 8.3. Workload based staff to patient day ratios[55] in medical facilities

Staff Category	[1]	[2]	[3]	[4]	[5]	[6]	Norm
General Medical Officers	42:1	37:1	45:1	48:1	41:1	46:1	20:1
Nurses	4:1	2.7:1	1.6:1	2.3:1	3.0:1	4.6:1	0.65:1
Pharmacists	148:1	111:1	181:1	335:1	368:1	229:1	105:1
Pharmacist Technicians	295:1	55:1	362:1	167:1	123:1	115:1	40:1
Laboratory Scientists	295:1	111:1	121:1	167:1	61:1	115:1	30:1
Radiographer	148:1	111:1	181:1	112:1	123:1	115:1	40:1
Inst. Domestic Supervisors	148:1	111:1	181:1	112:1	184:1	115:1	50:1
Clerical & Secretarial staff	30:1	20:1	20:1	30:1	26:1	25:1	9:1
Ancillary	6:1	3:1	2:1	4:1	2.5:1	4:1	2:1

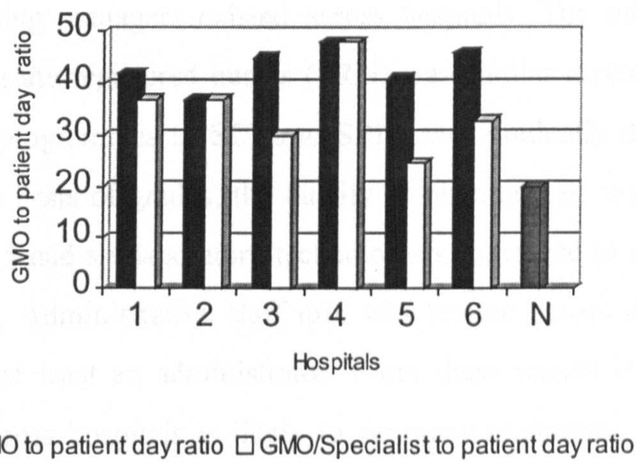
Doctors' inpatient workloads were twice as great as the expected for all the hospitals. This is clearly demonstrated in Figure 8.1. Involvement of doctors in management in clinical work, which was normally the case, slightly improves the observed ratios. However, the opportunity cost of such practices may be considerable. A different situation obtains if specialists are considered in judging hospital clinical capacity amongst the hospitals. In this case, hospitals 5 and 3 would assume clinical superiority with better ratios of 25:1 and 30:1 respectively.

The shortage of nurses was evident across the hospitals (Figure 8.2). Hospitals 1 and 6 experienced the most acute shortage of nurses with ratios of patients: nurses six to seven times the norm. Current nursing staff levels need to be increased by a similar margin to close that gap. These hospitals depended mostly on student and auxiliary nurses, and general hands. This coping strategy may compromise the quality of nursing services. Hospital 5 and 2 require a fivefold increase in number of nurses to reach acceptable

[54] Percentages were calculated using 14 staff categories out of 20. That is, excluding ancillary and administration staff, and clinical psychologist. The proportions less than 50% were: Hospital [2] 5/14, Hospital [3] 4/14, Hospital [5] 2/14 and Hospital [6] 6/14.

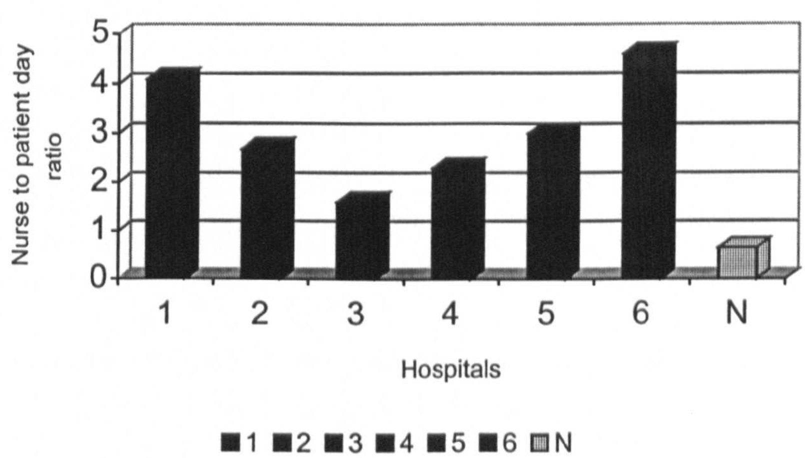
standards. Whilst hospital 4 and 3 had slightly better nurse to patient day ratios compared to others, the ratios were still below expected standards. For other non-medical staff, hospital 1 and 2 had relatively better pharmacy staff levels. Similar shortages were found for other staff categories across the hospitals.

Figure 8.1. Doctor to patient day ratios, Tertiary Hospitals 1997/98



N = norm

Figure 8.2. Nurse to patient day ratios, Tertiary Hospitals 1997/98



[55] Patient days per year/(number of staff x 204)

Quality of hospital staff was assessed by looking at different staff grades across hospitals. Five principal categories of hospital staff are reviewed (specialists, nurses, laboratory, administrative and radiography staff), and these are shown in Table 8.4. Hospital 5 had a superior specialist mix given that it had six out of seven required specialists. As mentioned earlier, lack of specialists at hospitals 2, 4, and 1 was a notable structural deficiency in tertiary care provided by these hospitals.

There was no standard grade mix for nurses. Nonetheless, no apparent differences in grade mix of nursing managers existed across hospitals. The mix of state certified nurses (SCN) and state registered nurses (SRN) was similar across the hospitals. The current upgrading programmes of SCNs to SRNs will gradually diminish these grade differences. On the basis of grades, the quality of nursing staff was similar across the hospitals. Hospital 5 had six laboratory technologists compared to an average of two at the other hospitals. Administrative staff mix was limited across the hospitals though each hospital had at least an administrator. From these results it seems that general scarcity of staff across hospitals is likely to seriously undermine quality of care and likely to be a more important determinant of quality variations than variation in quality of staff.

Table 8.4. Staff Mix and Grades by Hospital 1997/98.

Staff Category	[1]	[2].	[3]	[4]	[5]	[6]	Norms
Specialists:							
Obs. & gynae.	0	0	0	0	1	1	1
Surgery	0	0	1	0	2	0	1
Medicine	0	0	1	0	2	0	1
Paediatrics	0	0	1	0	1	0	1
Anaesthetics	0	0	0	0	0	0	1
Ophthalmology	1	0	1	0	0	1	1
Psychiatry	0	0	0	0	0	0	1
Matrons:							
Grade I	1	0	1	1	1	1	1
Grade II	0	1	1	1	1	2	1
Grade III							1
Nurses:							
SCN	27	56	112	90	72	24	293*
SRN	83	68	242	135	115	52	
Nurse Aides	34	20	23	21	24	7	
Laboratory:							
Lab. Scientist	1	2	3	2	6	2	6
Lab Technicians	5	0	4	4	0	2	**
S C. Lab. Ass.	0	0		0	2	0	**
Administration:							
Hosp. Admin.	1	1	1	1	1	1	1
Snr Exec. Officer	0	0	0	0	0	0	1
Executive Officer	1	0	2	0	1	0	1
Radiography:							
Radiographer	2	2	2	3	3	2	5
X-ray Asst/Op	1	0	0	0	0	2	2

Notes: * Not split according to SCN or SRN, ** There were no set standards by grade.

8.2.1.3 Drugs

Table 8.5 shows the drug availability situation for four of the study hospitals in 1997/98 from which data was successfully collected. None of the hospitals met the national guideline on essential drugs availability of 80% (ZEDAP 1996) or the provincial average of 70% (MOH 1997). Hospital 1 had a "satisfactory" level of drug availability throughout the year. Hospital 5 had an "unsatisfactory" level of drug availability meaning a higher number of drugs susceptible to frequent stock outs for longer periods of time. Hospital 4 had the greatest number of drugs that went out of stock during the year but for shorter periods of time (mean of 10 days). This means that drugs were generally available (85%) but supply was erratic. Hospital 6 had a fairly consistent but unsatisfactory supply of drugs, with a few drugs going out of stock for relatively long periods of time within the year.

Table 8.5. Availability of essential drugs, Tertiary hospitals, 1997/98

Hospital	Drugs Availability		Mean frequency of Drug Stock Outs	Mean Stock out period in days
	% never O/S	% never O/S+O/S for <14 days	Times/yr	
[1]	79	82	1.4	12
[2]	-	-	-	-
[3]	-	-	-	-
[4]	36	85	1.3	10
[5]	58	67	1.3	22
[6]	70	76	1.0	21

Notes: Highly satisfactory =100%, satisfactory = ≥ 80% and Unsatisfactory = < 80%
Essential drugs should have availability of 80% (ZEDAP 1996)

Data from tracer analysis (Section 8.2.2) shows that drug availability at hospital 2 and 3 was satisfactory, although it does not tell us about the number and frequency of stock-outs. In ranking these results a question that arises is whether or not it is preferable to have a consistent supply of fewer drugs or an erratic supply of all essential drugs. The frequency of drug stock outs may also reflect differences in utilisation levels, and disease patterns managed at the hospitals. From that perspective, it is possible that one hospital could have a fairly consistent supply of a specific drug because it is never or rarely used.

8.2.1.4 Buildings

All the hospitals were built in the early 1960's as general hospitals and therefore the condition of the buildings at the time of the study was a reflection of the hospital's building maintenance activities. Hospitals 2, 3 and 4 had fairly good buildings as shown by most of the quality ratings (Table 8.6). The other three hospitals rated poorly. There was overcrowding of beds, wards without separate duty rooms and inadequate ventilation. Hospitals 6 and 1 were relatively small, and the majority of the buildings deserved major refurbishment. Hospital 2 was undergoing refurbishment, and hospitals 3 and 4 were spacious with the majority of the departments renovated. Hospital 5 had a recently built outpatient department (3 years old) but the wards were small and usually overcrowded.

Table 8.6 A Comparison of the condition of hospital buildings across hospitals, 1999

Hospital/Factor	1	2	3	4	5	6
Availability of Space:						
Floor beds	Nil	Nil	Nil	Nil	Yes	Nil
Isolation wards	Nil	Yes	Yes	Yes	Nil	Nil
Proximity of beds	Squeezed	Normal	Normal	Normal	Squeezed	Squeezed
Separate duty rooms	No	Yes	Yes	Yes	No	No
Ventilation of buildings:						
Air circulation[56]	Average*	Good	Good	Good	Average*	Average*
Condition of ventilators[57]	Poor	Average	Good	Good	Average	Poor
Condition of roofs:						
Spoiled ceiling	NA	Nil	Nil	Nil	Nil	NA
Leaking	Nil	Nil	Nil	Nil	Nil	Nil
Lighting**:	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate

Notes: * The majority of ward nurses wore facemasks most of the time.

** Each hospital is electrified and had standby generators for emergency purposes.

From this structural analysis it is clear that all the hospitals experienced quality problems but with observable differences. The common and key feature of structural quality was availability of human resources. Hospital 1 could be generally rated as structurally poor since it had relatively low funding per bed, no consultants, acutely inadequate nurses, unsatisfactory building conditions, but a satisfactory supply of drugs. Similarly hospital 2 was poor because it had the least funding per bed, no specialist consultants, inadequate nurses, but buildings and drug supply were satisfactory. Hospital 3 could be classified as good because it had average funding per bed, specialist consultants, drug supply and buildings were satisfactory, and it had more nurses (90% of expected number) than the rest. Hospital 4 could be rated as poor because it had average funding per bed, no specialist consultants, unsatisfactory drug supply, satisfactory buildings and inadequate number of nurses. Hospital 5 had good structural quality since it had the highest funding per bed and the greatest number of specialist consultants. Hospital 6 had relatively good funding per bed, few consultants, the least number of nurses, unsatisfactory building conditions and poor drug supply—rated poor. The overall picture obtained from this analysis is that there were differences in service delivery potential across hospitals, but it does not tell us much about the differences in quality of service delivery across the hospitals. The translation of capacity into service delivery differs from one hospital to the other due to a variety of reasons. Using tracers it was possible to highlight differences in process quality across hospitals and identify which aspects of quality were deficient in hospital services provision.

8. 2.2 Patient level: Tracer Analysis

8.2.2.1 Tuberculosis

The global mean weighted quality scores for pulmonary tuberculosis management for four of the study hospitals are presented in Table 8.7. None of the hospitals fully met the desired standard of services rating. However, actual scores exceeded 75% (1.10) of the expected score. The global (or total) mean weighted scores were not significantly different across the hospitals ($p > 0.01$) even though hospital 2 had the highest score and hospital 4 had the lowest score compared to the rest (Figure 8.3). Lack of significant differences in quality scores signifies similarities in TB protocol compliance levels across hospitals. To adequately interpret these aggregate scores, it is necessary to look at the building blocks separately.

Table 8.7. Tuberculosis mean weighted quality scores, tertiary hospitals 1997/98

Hospitals/Quality Scores	[1] (n=31)	[2] (n=41)	[4] (n=37)	[6] (n=29)	Expected. Score	p-value*
Global mean weighted score	1.16	1.19	1.14	1.17	1.46	NS
Mean weighted process score	1.07	1.22	1.08	1.33	1.58	<0.01
Mean weighted structural score	1.22	1.16	1.18	1.05	1.33	<0.01

Notes: ANOVA test

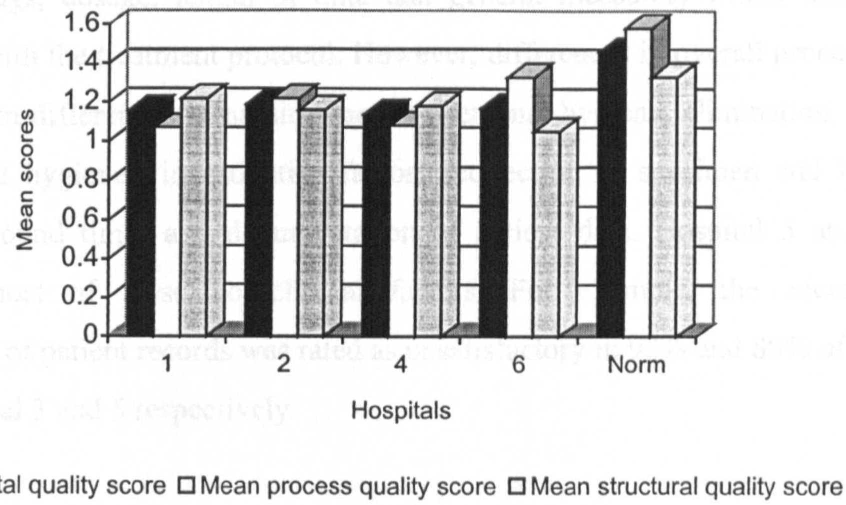
In interpreting structural quality scores note should be taken of the dearth of knowledge on the relationship between structure and process. All the hospitals fell within the upper-quarter of the expected score (Figure 8.3) even though statistically significant differences were observed amongst them ($p<0.01$). This suggests that all the hospitals could potentially provide services of comparable quality. Hospital 6 had the lowest

[56] Good meant one could sleep and eat comfortably in the building. Average meant one could sleep but not eat in the building, and bad meant that the building was totally unbearable.
[57] Good meant that there were enough functional ventilators per room. Average meant that all the rooms had ventilators and some were working and others not. Poor meant that there were inadequate working ventilators per room.

structural quality score (1.05) followed by hospital 2. For hospital 2, it was because of the following factors: wards had inadequate hand washing facilities, inadequate functional equipment, and presence of floor beds. The low score for hospital 6 is explained by poor ratings in the following factors: availability of drugs, presence of floor beds (crowding), inadequate equipment, and poor condition of the buildings. Hospitals 1 and 2 had ratings of 90% and 75% of expected scores, that is, structural quality scores of 1.22 and 1.18 respectively. The high rating for hospital 1 was due to better drug availability, working equipment and absence of floor beds (though crowded). Hospital 4 had adequate hospital space, and water and sanitation facilities.

Significant differences in process quality scores were observed ($p<0.01$) (Figure 8.3). Hospitals 2 and 6 had relatively superior ratings for the majority of process aspects except for supervision of sputum collection, direct observation of treatment and patient privacy. This means that they provided relatively better diagnostic, clinical and nursing services for inpatients. Hospital 6 had the lowest structural quality score but the highest process score. This illustrates the difficulties in identifying the relationship between structure and process. Hospitals 1 and 4 had relatively low process quality ratings even though their overall ratings surpassed 75% (0.99) of the expected score. Low process quality ratings could be linked to hospital clinical practice (protocol compliance), and patient and environmental hygiene. During the study, it became increasingly clear that important factors like patient counselling, direct observation of treatment, record-keeping, and patient hygiene were usually ignored by hospital staff. It is tempting to attribute these practices to high patient workloads, but negligence as a contributory factor cannot be excluded.

Figure 8.3. Mean quality scores for PTB, Tertiary hospitals



8.2.2.2 Malaria

None of the hospitals managed to fully satisfy the expected score for simple malaria (Table 8.8 and Figure 8.5). There were significant differences in the total quality score across the hospitals ($p<0.01$). Hospital 5 and 3 had consistently low quality ratings in both structural and process quality aspects as shown by their overall ratings. Caution is necessary in interpreting results for hospital 5 because of the small sample of 5 simple malaria cases. Frequency analyses of structural factors by hospital showed that low ratings for hospital 3 emanated from the cumulative effect of a number of factors but the following were key: inadequate ward toilets (92%), unclean toilets (31%), unavailability of hand washing facilities in the wards, and inadequate microscopes. Low ratings for hospital 5 were attributable to the following factors: no ward toilets, toilets were unclean (40%), unavailability of hand washing facilities in the wards, inadequate microscopes, crowding and floor beds. Hospitals 1, 2 and 4 had relatively higher ratings in all respects. The staffing situation at hospitals 1 and 2 was not better than the rest of the hospitals. It seems low utilisation levels may have enhanced the adequacy rating of facilities at these hospitals in terms of staff, space, sanitary and ablution facilities, and higher drug availability levels.

There were similarities in the ratings across hospitals in treatment-specific factors (e.g. choice of drugs, dosage, length of time and general measures) which implies high compliance with the treatment protocol. However, differences in overall process quality emanated from differences in nursing factors (personal hygiene, elimination, nutrition, environmental hygiene), investigative factors (collection of specimen and laboratory results turnaround time) and documentation of patient data. Hospital 5 and 3 rated poorly in most of these non-clinical factors. For example, the accuracy and completeness of patient records was rated as unsatisfactory in 92% and 80% of the cases seen at hospital 3 and 5 respectively.

Similar hospital rankings were found when severe malaria cases were considered (Table 8.8 and Figure 8.4). Again, hospitals 1, 2 and 4 had comparable and superior ratings whilst hospital 3 and hospital 5 had low quality ratings. The source of difference was in the investigative, nursing and structural quality clusters.

Table 8.8 Mean weighted quality scores for malaria, 1997/98

Hospitals/Quality Scores	[1]	[2]	[3]	[4]	[5]	Expect. Score	p-value
Simple malaria:	(n=47)	(n=21)	(n=13)	(n=12)	(n=5)		
Global mean weighted score	1.35	1.31	1.03	1.31	0.81	1.80	<0.01
Mean weighted process score	1.49	1.55	1.13	1.45	1.17	1.93	<0.01
Mean weighted structural score	1.19	1.05	0.91	1.18	0.47	1.60	<0.01
Severe malaria:	(n=9)	(n=11)	(n=37	(n=29)	(n=18)		
Global mean weighted score	1.37	1.30	1.24	1.36	0.90	1.64	<0.01
Mean weighted process score	1.55	1.51	1.48	1.55	1.15	1.70	<0.01
Mean weighted structural score	0.99	0.86	0.73	0.99	0.38	1.50	<0.01

For instance, hospital 5 was rated poorly in many factors some of which are: laboratory turnaround time (83%), patient weighing (94%), checking quinine use before treatment (88%), food quality (87%), records completeness and accuracy (94%), quinine stock outs (61%), availability of toilets (94%), adequacy of microscopes (89%) and conditions of buildings (89%). The cumulative effect of these factors and others negatively affected the weighted scores. The reverse was true for hospitals 1, 2, and 3.

Figure 8.4. Mean quality scores for severe malaria, Tertiary hospitals

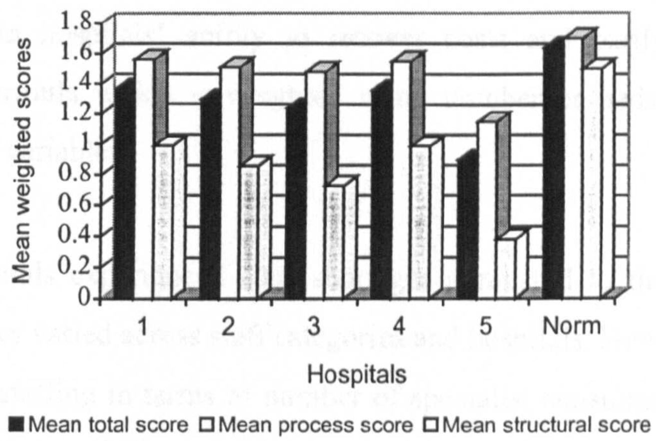
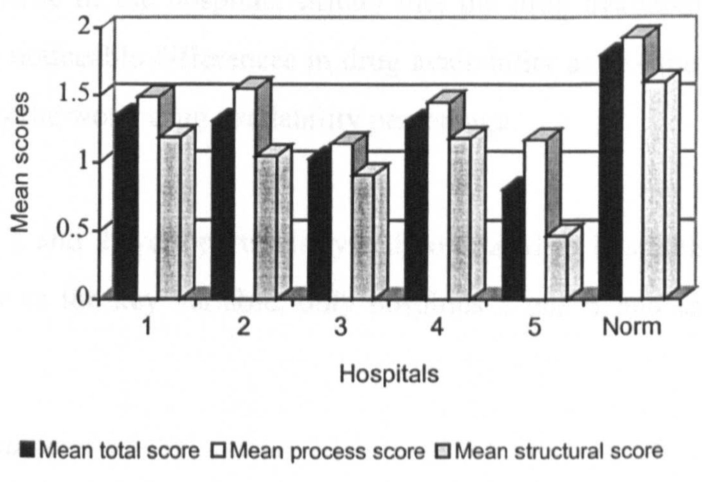


Figure 8.5. Mean quality scores for simple malaria, Tertiary hospitals.



8.3 Summary of findings

8.3.1 Hospital level structural quality

- The distribution of non-salary recurrent expenditure shows that hospitals 3, 4 and 5 were better endowed than hospitals 1, 2 and 3. Part of the differences emanated from differences in hospitals' ability to recover costs and partly from the resource allocation formula which is weighted using number or beds and workload data, among other variables.

- All the hospitals experienced staff shortages compared to the national standards. Staff shortages varied across staff categories and hospitals. However, hospitals 5 and 3 had better staffing in terms of number of specialist consultants and nurses whilst hospitals 1,2, 4 and 6 experienced acute shortages of nurses and consultants. Hospitals 1, 2 and 4 had no specialist consultants, which brings into question their role as tertiary institutions. It appears that the key issue was staff availability and not necessarily quality.

- Although none of the hospitals strictly met the drug availability standard of 80% there were noticeable differences in drug availability across the hospitals. Hospitals 4 and 5 had the worst drug availability percentage.

- Hospitals 1 and 2 were particularly old compared to hospitals 3, 5 and 4. Using ward space as the key variable, only hospitals 3 and 5 had satisfactory structural settings.

8.3.2 Tracer Quality

- There were no significant differences in the total quality (process and structure) score for pulmonary tuberculosis across the hospitals. When the total score is analysed in its decomposed form, significant differences are found among the hospitals. Hospital 6 and 2 had higher process scores. Process variables that contributed to the observed differences were related to patient and environmental hygiene.

- Both simple and severe malaria showed statistically significant differences in quality across the hospitals. Hospital 3 and 5 had relatively low scores for both structure and process aspects. This is largely explained by differences in protocol compliance and to a limited extent by differences in case definition.

It is clear that quality differences existed amongst the study hospitals at both the hospital and patient level. Differences in the physical setting and provider behaviour (protocol compliance) contributed to quality variation. The next question to be answered is: at what levels of resource use were these quality levels achieved? Was the observed quality achieved at lower costs or at high cost? What prevailing circumstances (under-use, misuse or abuse of services) are attributable to the observed quality-cost relationships? These issues are pursued in the next chapter.

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was matched by patient and hospital. All unmatched cases were excluded from the analysis leaving a sample of 79 simple malaria, 95 severe malaria and 149 tuberculosis patients for the first part of the analysis.

A graphical analysis was used in which each study hospital's mean cost per case and quality score were mapped on cost-quality scatter graphs with specific mean cost and quality score reference lines for each diagnostic group. Expected quality scores and related costs per case were computed using national treatment guidelines, discussion with experts and some of the general cohort results (see Annex IX). For each tracer, the minimum input package for an acceptable level of quality was costed using the ingredients approach. Deviations from the defined quality-cost reference lines were used to explore efficiency differences across hospitals. Composite analysis used aggregate mean costs and quality scores by hospital, and expected standards.

9.2. Results

9.2.1.Cost-quality trade-off using simple malaria

The cost and quality for simple malaria inpatients for five of the study hospitals are shown in Table 9. Hospitals 1 and 2 had relatively low costs per case compared to hospitals 3 and 4 even though they had comparable quality. All except hospital 5 had mean quality scores exceeding fifty percent of the expected quality score. Hospital 3 had intermediate quality and costs. Hospitals 4 and 5 had costs at least twice as much as those of hospitals 1 and 2. The lower costs of hospital 1 and 2 could be attributed to relative efficiency. These two hospitals achieved better quality with fewer resources. Hospital 5 had particularly high costs (even higher than the mean cost for severe malaria Table 9.1) but low quality (due to poor structural ratings), and seemed an outlier because of the small sample size used. Another possible explanation is that simple malaria cases were treated as severe cases since most of the cases seen at this hospital were severe malaria cases (spillover effect).

Table 9.0 Mean cost per case (ZW$) and quality score for simple malaria

Hospital	1 (n=41)	2 (n=18)	3 (n=7)	4 (n=10)	5 (n=3)	Expected
Cost per case	692.83	701.31	1,292.76	1,969.82	2,704.33	2,951.00
Quality score	1.35	1.30	1.07	1.29	0.81	1.80

All the hospitals fell short of the expected quality and resource use (cost) point—point E on the graph (Figure 9). What this means is that global resource use at each hospital was below what was technically expected, and that available resources were being used inefficiently as shown by the distance from the expected point (technical inefficiency) and location below it (allocative inefficiency). This means that available resources were not allocated to priority hospital activities, and that allocated resources were not used to maximum benefit. Hospital 5 shows inefficiency problems because it had resource use levels that were close to the expected level but the quality of services was relatively low. This means that it had potential to achieve better quality by improving use of current resources. This interpretation needs to be viewed with caution given the number of simple malaria cases considered in the analysis. Conversely, hospitals 1 and 2 had lower costs but higher quality suggesting relative efficiency. Inefficiencies can also be partly explained by differences in mean length of stay ($p<0.05$). Length of stay in itself may reflect necessary and unnecessary costs, hence efficiency or inefficiency. Hospital 1 and 2 had relatively low lengths of stay (3.1 days) whilst the others had a mean range of 3.2 to 5 days.

The results from the characterisation of the hospitals using the Pabon Lasso method (see Chapter 5) had hospitals 1 and 5 in the desirable sector 3, hospital 2 in sector 2, and hospitals 3 and 4 in sector 1 but within the expected performance area. What is interesting to see is that not only had hospital 1 relatively good performance indicators, it also achieved higher levels of quality at lower costs. Whilst hospital 5's scenario suggests the opposite[58]. The hospital had comparatively good performance indicators but these were achieved at relatively high costs and lower quality. Hospital 2 had intermediate cost and quality results corroborating the Pabon Lasso results of falling in sector 2.

[58] As mentioned earlier, the effect of the sample size warrants a cautionary view to this interpretation.

9.2.2 Cost-quality trade-off using severe malaria

Results from a similar analysis using severe malaria show hospital 5 with poor quality ratings compared to the rest of the hospitals with similar costs (Table 9.1 and Figure 9.1). This could be explained by inefficiency, because with the same resource basket, other hospitals were achieving better quality. A comparison of hospitals 1 and 4, for instance, shows similar quality scores, but considerably different costs. Generally, hospitals 1 and 2 had lower costs per case for similar quality scores compared to the rest. It appears that hospital 3 had intermediate costs and intermediate quality, and hospital 5 had lower costs and lower quality. Differences in length of stay were contributory to the observed cost-quality trade-off patterns (see Table 7.2).

Table 9.1 Mean cost (ZW$) and quality score for severe malaria

Hospital	1 (n=9)	2 (n=11)	3 (n=34)	4 (n=25)	5 (n=16)	Expected
Cost per case	1562.85	1766.44	2084.64	2571.30	1683.56	5421.22
Quality score	1.37	1.30	1.24	1.37	0.89	1.64

9.2.3 Cost-quality trade-off using pulmonary tuberculosis

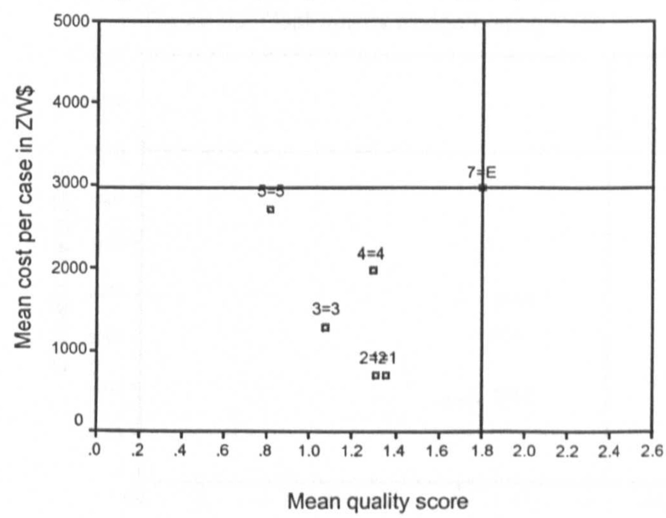
Table 9.2 shows the mean cost and quality scores per pulmonary tuberculosis inpatient. Although there were statistically significant differences in the mean quality scores across the hospitals ($p<0.01$), all but one attained at least 75% of the expected score. Most hospitals fell within the same quality band—1.01-1.33. Hospitals 4 and 6 had higher costs per case but no better quality than the others. Hospitals 1 and 2 as in other diagnostic groups, appeared relatively more efficient with superior quality scores for less cost.

Table 9.2 Mean cost and quality score for pulmonary tuberculosis

Hospital	1 (n=30)	2 (n=37)	3[59] (n=26)	4 (n=31)	6 (n=25)	Expected
Cost per case	1531.66	1461.65	1358.22	2765.55	3509.68	6996.55
Quality score	1.16	1.18	1.01	1.14	1.17	1.46

Figure 9.2 clearly shows that all hospitals except hospital 3 had similar quality ratings but different costs per case. For instance, the costs for hospital 6 were twice as much as those of hospital 2 but with the same quality rating suggesting inefficiency problems. In other words the same quality could be achieved at lower resource use levels. Furthermore, all the hospitals were distantly located from the cost reference line but closer to the quality reference line suggesting more allocative and less technical inefficiency. The generally high quality ratings can be explained by similarities in hospital compliance with TB national management guidelines.

Figure 9 Cost-quality tradeoff using simple malaria



[59] Hospital 3 results are shaded because there were not comparable with other hospitals because TB patients were only admitted for laboratory and observation purposes after which they were referred to an infectious disease hospital.

Figure 9.1 Cost-quality tradeoff using severe malaria

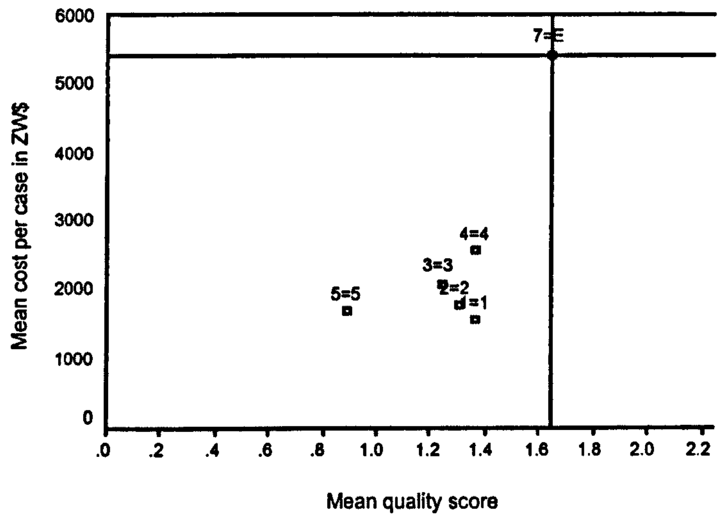
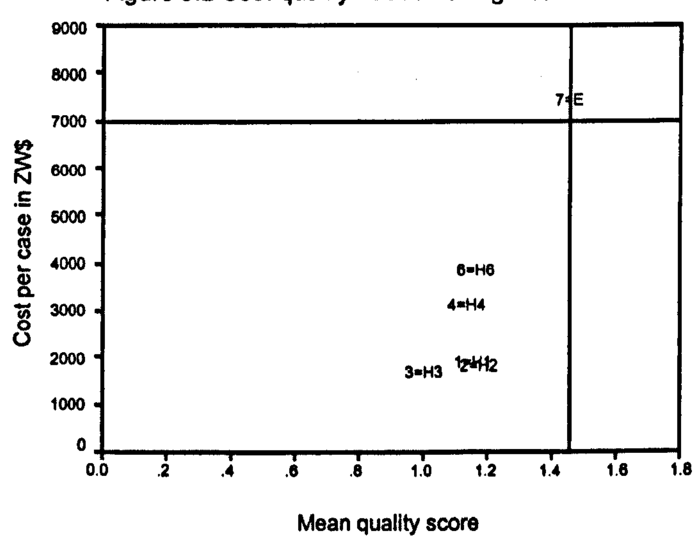


Figure 9.2 Cost-quality tradeoff using PTB



9.4 Summary of findings

The empirical exploration of cost-quality relationships in this study provided a number of useful revelations and observations. The major findings are summarised as follows:

- For all the three tracer diseases none of the hospitals met the expected resource use levels. This meant that the hospitals were experiencing allocative inefficiency and resource inadequacy problems because the minimum standards set were unachievable given resource constraints. The differences in the magnitude of the deviations of actual costs from the expected costs varied across the six hospitals as evidenced by their location on the scatter graphs. The definition of an acceptable minimum resource-use package for a particular service presupposes that resource allocation to hospitals follows a similar logic such that hospitals are expected to achieve certain levels of performance. In practice, public hospital are funded using, among other things, unweighted utilisation statistics such that an admission due to malaria is financed at the same level as one due to a severe cardiac condition. This effectively means that it is not possible, even if hospital management is aware of minimum standards of resource use, to meet the standards. However, if resource allocation to hospitals were based on a system such as DRGs, then failure to achieve such minimum standards would clearly show resource use inefficiencies.

- A comparative analysis of the finding shows that hospitals 1 and 2 were relatively better performers in terms of quality levels achieved for the costs incurred for all the diagnostic groups. The two hospitals generated better value for money compared to the rest. If the results for simple malaria for hospital 5 are ignored, hospital 5 had comparable costs per case but the lowest quality score. That suggests that it was relatively less technically efficient than hospitals 1 and 2 for instance.

- Hospitals 4 and 6 had mean quality scores within the range of hospital 1 and 2 but at higher cost. This suggests that hospitals 4 and 6 could potentially achieve higher levels of quality with the same amount of resources. In other words, high cost did not mean high quality in this case. Hospital 3 exhibited average performance for all the tracers compared to the rest.

It is interesting to observe that the classification of hospitals based on analysis of cost-quality tradeoffs is generally consistent with hospital and patient level costing results (Chapter 6 and 7). Although variations were found in some cost aspects, that general consistency suggests a sound basis using these results to infer relative performance.

CHAPTER 10 INTERNAL ORGANISATION AND MANAGEMENT OF PUBLIC HOSPITALS

10.0 Introduction

Analysis of internal organisation and management of hospitals furthers our understanding of the determinants of hospital performance, and enables reasonable predictions to be made of hospital responses to change. The working hypothesis underpinning this part of the study is that the way a hospital behaves is a function of the incentive structure that key players within it face. It is through manipulation of this incentive structure that appropriate behaviour can be nurtured in public hospitals.

This chapter addresses three objectives. First, to describe the internal organisation and management of public hospitals, and the related incentive regime. Second, to relate internal organisation and management, and the current incentive regime to hospital behaviour with particular focus on cost and quality of services, and hospital reforms. Third, to characterise and compare across the six case studies.

The chapter has four sections. The first section presents a conceptual review of internal organisation. The second section presents a description of generic features of internal organisation and management and decision-making space in public tertiary hospitals in Zimbabwe. The third section presents results from the six case studies, and the last section consolidates the results of the six case studies into a comparative analysis and summary.

10.1 Conceptual issues in internal organisation

In theory, there is a multiplicity of interrelated internal and external factors that impinge on hospital performance (Flood et al., 1982, Handy 1993, Chawla et al., 1996, Mullins 1999). This is even more the case for a hospital, given that it is a multi-input, process and product organisation and inevitably has several performance dimensions. In order to analyse hospital performance adequately it is necessary to clearly define the performance dimensions of interest. In this study, hospital performance is narrowly defined in terms of inpatient service quality and costs for two reasons. First, cost and quality are considered key hospital performance dimensions. Second, it was necessary to contain the scope of the study given its resource constraints. This definition excludes other performance parameters such as consumer responsiveness, equity and other system-wide functions such as clinical and preventive outreach programs (Lee and Hoare 1989, Chawla and Govindaraj 1996, Over and Watanabe 1998). This study focused on broad subject areas that allow both technical and qualitative processes of hospital inpatient service production to be analysed.

Hospital performance is subject to environmental factors such as: the hospital's designated role in the system (Lerberghe et al., 1997, Hongoro and Musonza 1998), functioning of the referral system, reimbursement methods (Barnum et al., 1995, Noterman et al., 1995), competition (Propper and Bartlett 1997, Zwanziger and Melnick 1988, Thompson 1994), intra-resource allocation, regulation, use of contracts (Paton 1994, Bartlett 1995, Ham 1997), community attitudes, demographic characteristics (Schulz et al., 1983), national policies and priorities, and the prevailing socio-economic and political situation. The debate about whether or not internal or external structure is important in understanding hospital behaviour is extensive (McGuire 1985, Champagne et al., 1993). Champagne et al., (1993) argue that organisational performance is directly affected by organisation factors, which are themselves influenced by environmental factors. The argument is based on the adaptive view of organisations, according to which organisations react, and take action in order to minimise the effect of environmental constraints and seize upon opportunities to improve performance. Other commentators (Berki 1972, Harris 1977) argue that the internal structure is of overriding importance in the analysis of hospitals because it is through an understanding of institutional characteristics that hospital performance can best be assessed and explained. A hospital is viewed as a grouping of different actors with variable interests and processes . McGuire (1985) concludes that there is an overlap between internal and external structure, and that the development of a hospital theory should start with the analysis of internal structure.

It would seem that this debate need not be polarised, but that both factors are important given the inherent overlap that exists between internal and external structure. However, it may be argued that we can understand more about hospital performance and its response to environmental change through an elucidation of the hospital "black box"—herein defined as internal organisation and management. It would also seem that the response of the hospital to environmental change is a function of the incentives created for different hospital players, and how these players perceive them. Performance is thus affected differently and with varying intensities depending upon the manner in which the hospital is internally organised and managed.

Patient characteristics are equally important in influencing costs and quality of care. Such characteristics include education, attitudes, health behaviour, type and severity of illness, age and living conditions. Clearly, the hospital has limited control over these factors. To a limited extent, however, public hospitals attempt to influence some of these factors through admission policies and outreach preventative programs (e.g. health education).

Figure 10 shows principal factor categories that potentially influence hospital performance(Schulz et al.,, 1983)[60]. It shows that environmental, patient, institutional, medical and professional and management characteristics and practices are inter-related. It also shows that there is no single factor that influences quality and costs of care. Institutional characteristics, management practices and medical and professional practices may be collectively called internal organisation and management factors (Table 10). Organisational theory argues for an analysis of these factors as a strategy to understanding organisation behaviour (Handy 1993, Cole 1995, Buchanan and Huczynski 1997). It would seem that a systems approach[61] to the analysis would be ideal as it permits a holistic analysis of the determinants of hospital performance but is difficult in practice (Handy (1993)

[60] A similar framework is given by Over and Watanabe (1998).
[61] System view means that "everything is related to everything else though in uneven degrees of tension and reciprocity" (Perrow 1973). Handy (1993) identified 60 variables relevant to the understanding of an organisation.

Table 10.0 Description of Organisational Factor Categories

Broad Factor Category	Specific Factors
Institutional Characteristics	Hospital governance, ownership, size, facilities, scope and complexity of services, decision-making space, utilisation levels Resources: devolved/ central budgets, planning, allocation, accountability[62], revenue collection Input procurement: structures, systems, internal distribution
Management practices	Type of structures, (non)participative styles, skills mix, experience
Medical and Professional practices	Clinical practice: therapeutic guidelines, scope and depth of technology used, clinical autonomy, medical audits Staff attitudes and behaviour, incentive structure, tension/conflicts, communication, coping strategies,

An understanding of the linkages between the different factors requires more than just an understanding of their physical relationships, but also an understanding of underlying behavioural aspects of the main actors associated with them (e.g. administrators and doctors). Institutional factors are important in understanding organisational behaviour because they define the degree of institutional flexibility, which is related to performance. These factors influence and are influenced by environmental and patient characteristics, and management and clinical practice. Understanding management practice is fundamental in an organisation because it influences both internal and some external factors. For instance, management might influence medical staffing, type of patients served, resources, and technology used. The main internal organisation and management factor categories are described and discussed in turn.

10.1.1 Hospital governance

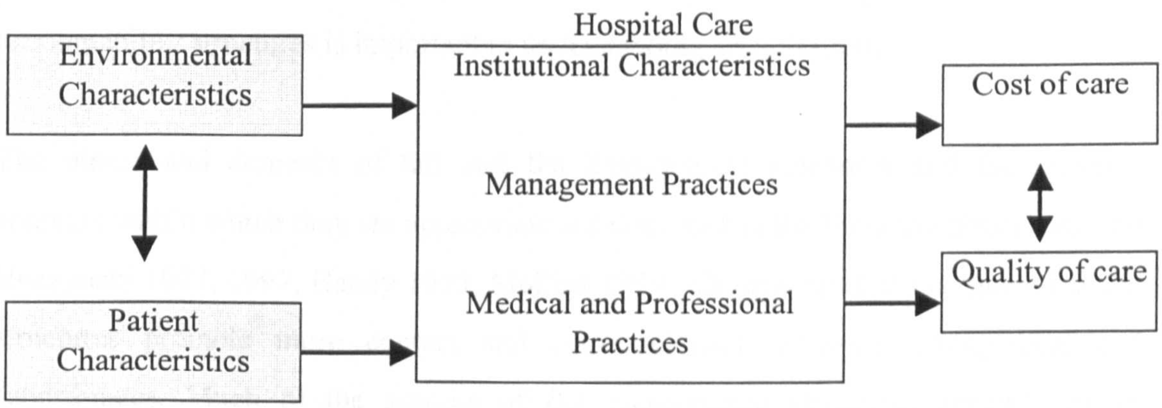
Hospital governance[63] refers to relationships between owners, users and management. Although public institutions are by definition publicly governed, the existence of Hospital Advisory Boards exemplifies community involvement, and in a sense community ownership through representative democracy. Members of the board are chosen from the local community by a senior public official (e.g. Minister of Health), and the board functions in accordance with government rules and regulations. This

[62] Accountability is narrowly defined here to mean transparency and accountability to fellow hospital workers

[63] Hospital governance is defined as the relationship between ownership and management of hospitals and how ownership is regulated.

means that the level of flexibility allowed to boards is likely to influence organisational effectiveness[64]. The constitution of these boards, the skills mix (Sloan and Becker 1981) and their level of participation in the governance of hospitals affect performance (Kovner 1981, Judge and Zeithamal 1992). This is supported by evidence from UK NHS hospital trusts (Peck and Spurgeon 1993). A key mandate of hospital boards in bureaucratically run hospitals is usually mobilisation of extra-budgetary resources and community involvement. The board's (in)activeness is related to hospital resource endowment and hence its ability to perform its tasks. The relationship between the board and hospital management becomes crucial in that respect.

Figure 10 Factors influencing cost and quality of hospital care



Source: Schulz et al., (1983).

10.1.2 Internal management structure

Organisational structure[65] has two purposes: (1) it facilitates the flow of information within the organisation in order to reduce uncertainty in decision making which is caused by information deficiency, and (2) for co-ordination of the different activities performed by individuals, teams, departments and divisions that make up the organisation (Cole 1995, Buchanan and Huczynski 1977). The type, role and

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[64] Flood et al. (1982) define effectiveness as the extent to which an organisation is successful in reaching its goals. However, the actual definition of goals is not simple and straightforward.

[65] Organisational structure is defined as . "simply as the sum total of the ways in which an organisation divides its labour into distinct tasks and then achieves co-ordination between them" (Mintzberg (1979) in

organisation of various internal management structures must adequately address these two purposes lest decision making and information flow is impaired. By looking at what management structures (including committees[66]) exist and for what purpose, and how each structure is positioned in the management hierarchy it is possible to explore possible effects of internal structure on performance. Internal communication is particularly important in allowing individuals and groups to share the vision, goals and constraints of the organisation and thus promote informed decision-making (Williams 1991, Mullins 1999). Better communication between nurses and doctors has been found to lead to better patient outcomes (Knaus et al., 1986). Similarly, communication between management and employees is generally considered important to organisational performance (Over and Watanabe 1998). Therefore an understanding of the nature and channels of communication, nature and structure of management, and related accountability structures is important in understanding organisations.

The merits and demerits of tall and flat management structures and the different contexts within which they are appropriate are discussed in the literature (Buchanan and Huczynski 1977, 1997, Handy 1993, Mullins 1999). On one hand, it is argued that flat structures promote more contact and communication between management and subordinates. Much of the success of flat management structures depends on an organisational culture that emphasises personal responsibility. On the other hand, it is argued that there are contexts such as the armed forces where tall structures are necessary because a short span of control is crucial for effectiveness. Flat structures might increase centralisation of decision-making by increasing the span of control (Cole 1995). This might happen in instances where the manager has to make all final decisions and does not appropriately delegate certain functions. It seems therefore that the choice of management structure depends on the type, size, and culture of the organisation[67]. In a bureaucracy, the intuitive argument is that any attempt to minimise hierarchy (through participation and delegation) is likely to have a positive impact on performance given

Cole 1995:pp 12) or "..an intangible web of relationships between people, their shared values and the tasks they set themselves to achieve those purposes (Cole 1995).

[66] Cole (1995) defines a committee as a formally established group for the purposes of decision-making, incorporating explicit roles (e.g. Chairman, Secretary) and rules of procedure (agenda, minutes, voting).

[67] Organisational culture refers to what is commonly known as organisation values that define preferred behaviour in an organisation.

the culture of tight and central control over decision-making. Hospitals may be characterised as professional organisations where different professional groups have specific technical roles, and to effectively manage them requires flat management structures. Flat structures provide opportunities for managerial participation[68]. It would also seem that the larger the hospital (scope of activities or specialties/sub-specialties) the less the appropriateness of flat structures, as the span of control becomes larger and larger (thus increasing the potential for centralisation of decision-making).

There seems to be debate in the organisation theory literature as to how managerial participation affects performance. On one hand, participation is perceived as some form of job enrichment (Duncan 1979) and a way of obtaining worker commitment through shared mission, goals and constraints. This argument is well summarised by Buchanan and Huczynski (1997:pp 625): "a participative management style can improve organisational effectiveness by tapping the ideas of people with knowledge and experience, and by involving them in a decision-making process to which they then become committed. This style can thus lead to better quality decisions which are more effectively implemented." Participation develops a sense of staff ownership and willingness to implement decisions, and even volunteer new and creative ideas and solutions. On the other hand no participation is preferred, if participation is perceived as territorial violation (Handy 1993, Cole 1995:328). For example, physicians may perceive territorial violation in greater patient or hospital management participation in clinical decisions. In this context, other factors (than territorial violation perception) would seem to be relevant. However, physician participation in managerial decision making (e.g. budgetary control) may avoid perceptions of violation while encouraging physicians to introduce managerial concerns to their decisions making. This would suggest that in contexts where doctors and other resource users do not have clear accountability structures for their activities, participatory management is likely to improve organisational performance through consultation and information sharing.

[68] Participation is loosely defined here to mean active involvement in influencing decision-making in the hospital but without necessarily equal power. Idealy there must be equal power for effective participation (Lee and Mills 1989).

For participatory management methods to work, Handy argues that they must meet five criteria: (1) call for participation must be genuine, (2) it must be considered worthwhile by all involved, (3) role of participants must be clear, (4) participants must have the skills and information to participate effectively, and (5) managers must want to participate. Therefore, the success of participatory methods as management styles depends on the extent to which these conditions are met.

Another aspect to consider in the analysis is the physical internal organisation ("the anatomy"), that is, whether or not the hospital is organised by departments or directorates and with what levels of functional autonomy from central administration (Sloan and Becker 1981). It is argued that departmentalisation creates smaller groups, in which individual activities can be observed, and monitored. An authority system can be devised with the locus of control kept within the department (Sloan 1981, Champagne et al., 1997). What is key to hospital performance is the level of departmental autonomy. It would seem that if hospital departments have devolved budgets and authority to make key decisions they are likely to perform better. The level of decentralisation of activities in the hospital defines the level of departmental responsibility and accountability.

10.1.3 Managerial Capacity

This may be the most important factor in organisational performance because all the other components (domains) depend on it. Performance is likely to vary with managerial capacity: that is, the skills mix (competencies) and experience of hospital "managers" at all levels. Management's role is to translate hospital policies and objectives into practice: achievement of organisational effectiveness. That requires a variety of simple and complex decisions to be made concerning production techniques, use of staff, supplies and various other inputs. The hospital situation is unique in that professionals take the lead in the production of services, and it is only through internal communication and consultations that management may influence the production process (especially clinical activities). The ability of managers to communicate with doctors and consultants is likely to have a positive impact on performance. The hypothesis is that those hospitals with management capacity to effectively engage doctors and other non-clinical managers through communication and involvement are likely to perform better than those without.

10.1.4 Incentives and motivation

Incentive theories are but one component of motivation theories. Incentive theories[69] are based on the assumption that individuals will work hard if they are given specific rewards for their work effort. The role of incentives in driving individual and organisational behaviour is thus key to understanding organisational dynamics and performance. The key question is what are those things that make people in an organisation work harder or not—the motivators. Bernard (1938) argues that "the contributions of personal efforts which constitute the energies of organisations are yielded by individuals because of incentives". Incentives can be monetary or non-monetary as in job autonomy, status, power, authority and interesting work. Money is important in our thinking about causes of behaviour both because of what it can purchase and because of the status attached to it (Pfeiffer 1995, Handy 1993). In public institutions where staff are paid non-performance-related salaries, annual money rewards may not necessarily motivate people but if high rewards are perceived as returns for individual effort staff might be motivated to work harder (Xingzhu 1999). In cases where staff are not paid according to performance, non-monetary incentives (e.g. prizes, promotion, job enrichment, recognition, access to continuous professional education, workshops and loans) may be more relevant in influencing individual and group behaviour. For these rewards to be able to "incentivise" people to improve performance they must be distributed in ways that are perceived to be related to work effort, performance must be measurable and attributable to the individual, the individual must expect the reward, and the increased performance must not become a new minimum standard (Handy 1993, Pfeiffer 1995). In a hospital situation individual performance might be difficult to measure because of "jointness" of activities between different staff categories (e.g. doctors and nurses) which might require complex reward systems (Xingzhu 1999)

[69] The underlying assumption is that people are economically rational, can bargain and are concerned about work, money and conditions of service (Handy 1993).

It is important to distinguish between those incentives that reduce staff turnover and those that motivate people to work more in an organisation. For instance, it may be argued that high salary, subsidised accommodation and job security may reduce turnover but not necessarily motivate people to perform better. Furthermore different groups within the hospital organisation may have different incentives, and therefore behave differently which might lead to sub-optimal performance (Harris 1977, McPake and Archard 2000, McPake, Hongoro and Archard 2000). Differences in incentive structures might create tension within and/or between staff groups. Revealed individual coping strategies in relation to high workload and low income may be insightful in understanding individuals' objective functions.

10.1.5 Financial management

Resource management is important in ensuring efficient production of hospital services. In theory there is a relationship between internal organisation and costs and quality of services. For instance, departmentalisation with functional autonomy is argued to be a viable strategy for creating cost consciousness and responsibility amongst hospital staff (Sloan 1981, Harris 1977). That is a similar concept to clinical directorates in the British NHS in which hospitals are organised into directorates with specific budget responsibilities (Propper and Bartlett 1997). The merit of this system is that doctors become directly involved in both resource planning and use. With devolved budgets, the locus of control is clear and resource use accountability can easily be sanctioned. Though a plausible option of internal organisation, line managers[70] and especially doctors may resist increased accountability for departmental or committee performance preferring instead to concentrate on patients or the service. That potentially creates tension between them and administrators. How these tensions are actually resolved has been little studied.

[70] Line manager in this study refers to a head of department, for example sisters-in-charge of wards/theatre, heads of pharmacy, laboratory and others. The terms are used interchangeably.

10.1.6 Technology

Technology in this study refers to the hospital "plant" which includes equipment, buildings and production processes that occur in a hospital organisation. The assumption here is that those hospitals with relatively better equipment, and buildings are more likely to produce better quality of services at low or high costs *ceteris paribus*. The hospital "plant" can be organised in various ways. In some hospitals, laundry services for instance, are contracted out and in others services are produced in-house. Some hospitals have CT scans others not. The use of high technology may or may not increase costs (Rivers and Bae 2000). Differences in production technology among hospitals may help explain observed cost and quality differences. The analysis of technology may be done as part of structural quality assessment.

10.1.7 Clinical practice

Sloan and Becker (1981) argue that the most important hospital input is the doctor. Doctors make most resource consumption decisions since they decide on patient admission, diagnostics, treatment and discharge (Drummond 1990, Bartlett 1995, Bennett 1997). In addition, they have influence on hospital equipment profiles by virtue of being technical experts. Performance may vary across hospitals because of differences in clinical practice (Ham 1988, Morgan 1988), which itself is influenced by many factors: employment status and reimbursement methods of doctors, hospital reimbursement methods, availability of facilities and differences in medical opinion (Ham 1988, Xingzhu 1999). It is generally argued that doctors are more concerned with services and/ or quality (Harris 1977, Crilly 2000), especially in cases where they are not budget holders and therefore are not accountable for cost consequences of their activities. This is typical of public hospitals where internal organisation is structured in such a way that doctors operate fairly autonomously and are not involved in hospital-wide decision making. Entrusting doctors with some management responsibilities or at least involving them in management activities might make them cost conscious. That means that doctors would then be able to make informed decisions in relation to what services to provide (service mix) and how to provide them.

The nature of functional arrangements for doctors in hospitals creates different incentives. If public doctors are allowed to do private practice outside hospital environs after hours as in Thailand (Pannarunothai and Mills 1997) and Zimbabwe, more doctor time might be spent in private than in public practice. Hospital performance might be affected as doctor waiting time gets longer, theatre lists increase and discharge of patients is delayed. If doctors do practice privately within the hospital environs after hours, it might be that quality of care does not change but health care costs might increase due to relatively high service intensity for private patients. Doctors might also encourage patients to attend privately by allowing quality of care to fall in public services (McPake and Hanson 2000). Apart from the payment methods for doctors, the different modes of facility organisation and physician remuneration have different incentive structures and therefore are likely to lead to different types of behaviour by doctors (Bennett 1997). Another aspect of clinical practice is use of clinical guidelines (e.g. EDLIZ) and peer reviews or medical audits. Hospital performance is likely to be influenced by the existence of medical audits (or its variants, for instance drugs and therapeutic committees) and the degree of doctors' compliance with treatment protocols.

10.1.8 Input procurement and distribution

Conceptually, the capacity of a hospital to respond to internal input demands has a bearing on its performance. Capacity is defined as the structures and mechanism hospitals have to ensure efficient and effective production of hospital services. Unavailability of essential inputs may create inefficiencies and poor quality due to inappropriate input mix and levels. In most public systems in LMICs inputs are centrally procured in order to benefit from economies of scale through bulk purchasing, to control input quality, and to minimise pilferage. Often such systems are inefficient with poor distribution systems and rigid rules for purchasing inputs elsewhere. Those hospitals that adapt by designing flexible operational arrangements for procuring and internally distributing inputs are likely to cope and perform better.

The above eight areas of inquiry therefore guided the investigation of hospital internal organisation. In addition, respondents were asked their views of a series of "tracer reforms". This may assist in further understanding staff attitudes and behaviour towards current performance. In other words, staff views about what may or may not be reformed reflects how they perceive the current system and their willingness to change it. Willingness to change is a function of how people trade-off costs and benefits associated with the *status quo* and those associated with change. These costs and benefits are defined by what different individuals (or groups) perceive as their role and objectives in the hospital. For instance, if change means abolition of private practice by public doctors then doctors would perceive such a change differently from administrators or nurses. The choice of tracer reforms must represent significant shifts in existing incentive structures and in the culture of doing business in public hospitals, if they are to reveal individual preferences. A related assumption is that reforms are unlikely to succeed if key stakeholders (hospital staff) do not view reforms as necessary and/or appropriate for improving performance.

To date, general frameworks of hospital performance have been applied in a few LMICs (e.g. Needleman et al., 1996, Collins et al., 1996, Govindaraj et al., 1996) with some limited success. In most of these, little attention is given to organisational behaviour and its determinants. This is partly because of the difficulties associated with organisational research, and partly because of the differences in reference frameworks used by different researchers from different disciplines who tend to emphasise certain dimensions of performance. Linking economic and organisation theory can yield insightful results in understanding organisations (Williamson 1995, Champagne et al., 1993, Mitchell 1997).

In order to explore organisational determinants of hospital performance, several specific interrelated hypotheses were formulated to guide the qualitative component of the study. As shown above the study used organisation theory to identify variables that potentially affect performance. The idea was not to establish causation but to establish associations. The hypotheses considered were:

- The (in)activeness of a HAB influences hospital extra-budgetary resource endowment and hence its capacity to perform its tasks.
- Hospital performance varies with differences in management capacity. The more skilled and experienced the managers are, the better the performance.
- A management structure that facilitates information flow and co-ordination within the organisation positively impacts on performance. Co-ordination and information sharing increases general staff awareness of consequences of their activities on the organisation.
- Participatory management styles improve consultation and information sharing and hence performance. In other words, differences in management capacity to engage clinicians and other hospital staff in making hospital-wide decisions is contributory to performance differences.
- Hospitals with decentralised systems of resource-use are likely to be more efficient.
- Hospitals that are more structurally endowed are likely to perform better than those that are not.
- Hospitals with adaptive operational arrangements for procuring and internally distributing inputs are likely to cope with internal demands and hence perform better.
- Staff in public hospitals "satisfice"[71] because of the incentive structure they face.

10.2 Methods

The study was conducted at six tertiary hospitals—a multiple case studies design (Rose 1991). A case study[72] design was used to allow for in-depth understanding of the hospitals' internal environments, and a multiple case studies design to allow for comparisons (Rose 1991, Schofield 1993, Traynor 1995, Keen and Packwood 1999). The studies could be viewed as "snap shot" pictures because a period of two to three weeks was spent at each site. The choice of hospitals was guided by the quantitative analysis, and typicality (see Chapter 6) was a major consideration (Schofield 1993). A

[71] Satisficing means seeking to attain a 'satisfactory' overall performance (e.g. work effort, fee income and quality) as defined by aspiration goals, rather than maximising it (Koutsoyiannis 1975).
[72] A case study is an empirical enquiry that: investigates a contemporary phenomenon within its real life context: when—the boundaries between phenomenon and context are not clearly evident; and in which—multiple sources of evidence are used (Yin 1989:23 quoted in Rose 1991).

three pronged approach (triangulation) was used to ensure cross-validation and supplementation of data collected (Rose 1991, Brannen 1992, Miles and Huberman 1994). The first and main approach was semi-structured interviews with hospital managers at various levels of management using a semi-structured interview guide (Annex X)[73]. The interview guide was loosely structured to permit flexible discussion, further probing and exploration of issues, and consistency in the subject domains for discussion across respondents (Allan 1991, Britten 1999). Respondents included medical superintendents, heads of departments (line managers) such as nursing, pharmacy, wards, laboratory, physiotherapy, and dietary services, and staff (doctors, consultants and nurses). The target number of respondents per institution was 10 (60 for the entire study). A total of 52 respondents were interviewed (Table A10.1). The majority of interviewees refused to be tape recorded, and data were captured in note form at the time of the interview and after. Informed consent was sought from the respondents before the interviews and confidentiality guaranteed (see Burges 1984, Jones 1991, Britten 1999). The second approach involved non-participant observation through attending management meetings at the hospital as a way of exploring internal dynamics, power and authority structures (Packwood et al 1991, Hall 1993, Pope and Mays 1999). The third approach involved a review of hospital records: memos, minutes of meetings, and hospital reports. These methods were used to supplement and further explore issues raised in the in-depth interviews.

Data was analysed manually and the same procedure was applied to all six case studies. The analysis adapted the "Framework" approach[74] (Ritchie and Spencer 1994, Pope, Ziebland and Mays 1999) because it permits a systematic and repeatable data analysis process. Some stages of the analysis were combined or skipped as described.

Stage 1 Familiarisation: This involved randomly examining selected notes from interviews, meetings and records to take stock of what data was available, and identifying key themes and emerging issues.

[73] Table A2.1 shows a summary of some of the management subject domains for the interviews.

[74] 'SCPR's Framework approach' includes five stages of qualitative data analysis: familiarisation, identifying a thematic framework, indexing, charting, and mapping and interpretation (Ritchie and Spencer 1994). It is a deductive form of analysis.

Stage 2 Identifying a thematic framework: In this study, the thematic framework was to some extent established in advance because questions asked were based on predefined subject domains (a priori issues). It involved exploration of response content and noting of key issues (including emergent themes) that could be used to categorise the data. The idea was to reduce the textual data into manageable categories that could be retrieved and repeatedly explored. The themes were "lifted" from their original context and rearranged according to the sequence of subject domains in the interview guide. It was important in the process to organise data in such a way that original research questions are fully addressed.

Stage 3 Charting: involved application of the thematic framework to transcriptions of individual interviews from the case studies, and continuously reviewing it to accommodate emerging case-specific issues. Instead of referencing the interview text by themes (Indexing[75]), a system of tallying individual responses by theme (category) was used. In the process of tallying responses, important respondent and hospital specific quotes were captured per theme. This was feasible because the interview transcripts were referenced (or coded) by hospital and respondent.

Stage 4 Mapping and interpretation: After sifting and sorting the data by core themes the data were analysed and interpreted with the guidance of the research questions and study hypotheses. This involved searching for patterns in perceptions, inter-linkages and possible explanations, and generally attempting to build the overall picture of each case study, and all the case studies. A constant search for deviant cases throughout the analysis process was observed—deviant case analysis (May and Pope 1999).

10.3 Results

10.3.1 Description of hospital internal organisation and management

The purpose of this section is to provide a descriptive synthesis of observed commonalities across the study hospitals. It is against this background that specific case

[75] 'Indexing' refers to the process whereby the thematic framework or index is systematically applied to the data in its textual form.

study results are presented and discussed. It seems reasonable to argue that differences in performance across hospitals cannot be explained by shared attributes but by differences in institutional characteristics.

There are common organisational and management features of public hospitals in Zimbabwe. These features are inherent in most bureaucratic systems, namely: core management structures, hospital governance, and degree of functional autonomy. However, differences in performance are still observed amongst them because of differences in the way these structures function. It seems opportunities for innovation exist within the bureaucratic system, as the results will show. The common features are discussed in turn.

10.3.1.1 Organisational and management structure

The managerial structure of public hospitals is generic and prescribed by policy (MOH 1982). Hospitals are managed by an executive composed of five principal cadres that include a medical superintendent (head of the hospital and must be a doctor), matron (nursing manager), administrator, pharmacist and principal nursing tutor. In practice, there is variation in hospital executive (HE) membership as additional members are co-opted into the executive depending on the management style of the medical superintendent. The executive is the top management team responsible for setting hospital policies in accordance with national policy, planning and budgeting, and ensuring the general wellbeing of the hospital. Below the executive are various departmental heads[76]. Linked to the HE is a Hospital Advisory Board (HAB) composed of prominent community members appointed by the Minister of Health with the guidance of the HE. The administrator is the secretary to the board whilst the medical superintendent and the matron are ex officio members. The role of the HAB is to link the community with hospital activities through mobilisation of community resources, and to assist the hospital in a variety of ways(for instance, fund raising). In a sense, the HAB acts as the political part of the hospital's management structure with hardly any governance role.

The HE is supported in its activities by national policy prescribed committees with specific responsibilities such as the procurement, finance, and drugs and therapeutic committees. The procurement committee is by necessity composed of the administrator, the pharmacist and any other line managers. Its role is to discuss and advise on: input requirements for the hospital in liaison with HODs, alternative ways of input procurement, preparation of tender documents, and adjudication over prospective suppliers' quotations and sanction expenditure. It also ensures that national tender procedures are followed. The drugs and therapeutic committee is composed of the pharmacist, doctor(s), laboratory technologist and nursing manager(s). Its main tasks are to ensure that generic (or cheaper) drugs are rationally used, discuss prescriptive practices and appropriate remedial action, ensure treatment protocols are followed (use of EDLZ 1994), and any other issues related to drugs and therapy. The finance committee comprises of the administrator, the medical superintendent and one or two members from the HAB. Its role is to manage the hospital's extra-budgetary income (retained fee income and donations) which is kept in a fund called the Health Services Fund (HSF). Hospitals have the latitude to form other committees with other roles in addition to ones described.

Internally, the hospitals are organised into departments and each has a head. There are no clinical directorates but wards, which are, categorised by broad diagnostic groups, sex and age of patients. For example, female medical ward, female surgical ward and others. Wards are managed by in-charge sisters and not by clinicians. Operationally, the activities of the HE inter-link with other departments through regular inter-departmental meetings. Such meetings provide opportunities for wider discussions on hospital activities.

10.3.1.2 Hospital governance

Hospital governance is defined as the relationship between ownership and management of hospitals and how ownership is regulated. Public hospitals as government entities are managed by a bureaucratic and hierarchical system. The role of the hospital, that is, its

[76] Departments include wards, laboratory, physiotherapy, kitchen, radiography, and pharmacy

scope and scale of activities is determined by government (owner). In principle, the government attempts to organise and direct hospital activities to meet the interests of society (the principal) through deliberate policies and regulations. Hospitals cannot set mission statements and strategic goals outside those of government. It was not surprising that mission statements of the six study hospitals were the same and as broad as the Ministry's, "...to improve the quality of life of people." The governance situation is different from autonomous hospitals where boards have much influence in hospital operations.

10.3.1.3 Management functions and autonomy

The role of management and the degree of freedom it experiences is inextricably linked to hospital governance. In other words HEs manage hospitals in accordance with the government(owner) policies and objectives. The functions are summarised as seven principal hospital domains (Table 10.1). The responsiveness of hospital management to environmental changes depends on the degree of autonomy entrusted to it by the owner. The study hospitals had limited decision-making space at both strategic and functional level. The decision making space was explored by each hospital functional domain.

Table 10.1 What the Hospital Executive can, and cannot do by functional domain.

Hospital Domain	Specific functions	Restrictions
Strategic Management	• None	• Direct control by government • Cannot set mission and objectives • Role defined by government
Financial Management	• Planning and budgeting • Cost control • Expenditure decisions within votes • Relative freedom in the use of retained fee income (HSF)	• Cannot finalise own budgets • Cannot vire funds between votes without permission • Cannot use fee income for staff salaries • Cannot make capital purchases or disposals • Cannot set hospital fees • Non-distribution constraints • Cannot borrow funds
Personnel Management	• Staff recruitment within established posts • Allocation and distribution of staff • Recommend staff for promotions, training, and discipline	• Cannot effectively appraise staff and award or discipline deserving cadres • Cannot effectively dismiss staff
Input procurement	• Decide on what, when and how much to spend from the HSF/budget • Follow tender procedures in spending budgetary allocations	• Cannot purchase capital inputs • Cannot buy from the private sector without bureaucratic approval [when using budget allocations]
Clinical Practice	• Admission, discharge and referral polices	• Drug prescriptions according to EDLIZ • Use of treatment protocols for specific diseases
Technology	• Treatment choices within MOH guidelines. • Clinical freedom	• Cannot decide on capital equipment procurement. For instance, CATs. • Cannot assume treatment protocols outside EDLIZ.
Administration	• Operational day-to-day decisions through its members	• No explicit restriction

Strategic management: Hospitals are unable to set long term goals concerning the scope and scale of their activities. For instance, the decision of whether or not to provide dialysis services or kidney transplant is made at national level. Therefore, activities can only be planned and implemented on the basis of short-term objectives covering a financial year. Inevitably, managers lack strategic vision and planning skills, and such an arrangement stifles innovation and the ability of hospitals to adapt to changes in the environment. The fact that tertiary hospitals are part of a referral hierarchy means that their activities are also driven by other external factors.

Financial management: HEs plan and make budget proposals to the Ministry through the provincial directorate every year. The non-salary recurrent budget is disbursed in thirteen votes (line items)[77]. The medical surgical vote forms the bulk (50-60%) of non-salary recurrent expenditure and is managed through the pharmacy department. The provisions vote is managed by the dietary department and the rest by administration. Budget allocation is not fully devolved to departmental level and the HE, through the hospital administrator, allocates resources to departments through an expenditure approval process. All expenditure requests including those from pharmacy and kitchen are sanctioned by administration. The salary budget is managed from the Ministry of Health. Hospital management has freedom to make expenditure decisions within votes but viring requires external approval. This in itself is a major handicap to efficient service delivery. The introduction of fee retention in 1996 gave hospital management the latitude and freedom to decide on the use of fee income. Use of hospital income is considerably devolved to the hospital level with limited restrictions—that it cannot be used for staff salaries or managerial benefits.

Personnel management: Hospital personnel are managed from the centre through the Public Service Commission (PSC). However, hospitals can recruit staff within defined staff establishments. That is to say, if a hospital has *n* designated posts in any staff category, it cannot employ more than *n* people. Neither can hospitals retrench excess staff (which is rare). All the hospitals had staff problems requiring more staff than was provided for by PSC establishments (see Chapter 8). The problem is compounded by the fact that staff establishments are not regularly reviewed to reflect changes in utilisation levels. Related to this problem is the impossibility of switching service-specific posts (e.g. x-ray operators) to other activities because of PSC restrictions. This makes hospitals unresponsive to patient needs. Staff discipline is another problem because the executive cannot effectively discipline staff. The executive can only recommend to the PSC but not execute disciplinary measures. In many instances the disciplinary process takes long to be effected, so limiting its intended effect on staff behaviour. The executive had no control of staff remuneration. Staff is paid non-performance related salaries, and there is no mechanism for rewarding good performers and punishing bad ones. In 1996, the government introduced the concept of key result areas where each staff member agrees

[77] Includes medical and surgical, provisions, printing and stationery, domestic expenses, fuel, lights and water, office miscellaneous, bedding and linen, laundry services, fares, official travel, travel and

with her manager, objectives and targets at the beginning of each year. At the end of the year staff are appraised on the basis of agreed objectives and targets. Despite the potential positive impact of this staff appraisal concept on hospital performance staff appraisal is still not linked to remuneration, promotion or any other incentive and is judged to have had little effect. One may conclude that existing human resource management strategies do not encourage improved performance.

Input procurement: A key element in determining the supply side response of hospitals is the ease with which hospitals can procure essential inputs. The six hospitals used similar input procurement strategies except where non-budgetary resources were used. Most inputs are centrally procured through the Government Medical Stores (GMS), and private suppliers can only be used with the permission of the GMS. Lately, GMS has been experiencing funding and inefficiency problems resulting in erratic supply of medical and surgical supplies to hospitals. Hospitals had to use private suppliers who charged market prices but supplied on time. This fuelled hospital cost escalation since hospitals were no longer benefiting from lower input prices supported through bulk and central purchasing. Although hospital fee income contributes a small proportion of hospital revenue, it was used to bridge the input supply gap created by the time consuming private sector supply approval process and inadequate resources. Clearly, such input procurement arrangements are inimical to effective and efficient hospital services delivery. This was a major source of frustration for managers, and fuelled regular breakdowns in internal resource allocation systems.

Technology: Currently, tertiary HEs cannot make decisions on what services to produce, how and for whom to produce those services. This can be explained by three factors. First, tertiary hospitals are part of a referral chain in which they have a specific function, which is defined by the centre. Second, decisions of whether or not to acquire modern or cheaper equipment or new drugs is made at national level. Third, as public institutions, hospitals services are intended for the general public with no specific target populations. Adoption of hospital technology is not subject to user influence (as is sometimes the case in the private sector). This could also be explained by the publicly tailored objectives rather than

subsistence, and post and telecommunication.

profit or surplus motive of public hospitals. The decision-making environment in which these hospitals are operating creates inertia, and innovation, even in the interest of the principal, is risky.

Clinical practice: Clinical practice is the domain where there seems to be relatively more decision making space given available hospital technology. Clinicians decide on admissions, patient management, discharges and referral policies. Doctors and moreso, specialist consultants tend to operate independently in the wards. This functional autonomy might help explain variation in hospital performance as clinical practices may differ. Hospital executives may have different degrees of influence on clinical activities, and these differences might explain part of the differences in performance.

Administration; Day to day operational decisions were delegated to the administrator and/or the medical superintendent with variable involvement of other members of the executive (as the case studies will show). The only administrative restrictions experienced related to those highlighted in the other hospital domains. Administrative capacities varied across the hospitals (discussed later).

10.3.2 Hospital Financing

There are two methods of hospital financing. First, hospitals receive an annual budget for non-salary recurrent expenditure. The salary and capital budgets are managed from the Ministry of Health. The computation of the annual recurrent budget is based on available facilities, activity statistics, and demographic factors. The budget covers the provision of services for both paying and non-paying patients[78]. Any budgetary savings are returned to the national treasury, and this creates negative incentives to cost saving. Managers may design spending strategies that ensure that the budget is used within the financial year and no savings are made, even in the rare circumstances that such opportunities exist. Managers have particularly strong incentives to highlight resource inadequacies in this context. In practice, budgetary savings are rare because of

[78] Paying patients are defined as those earning a salary income of at least ZW$400 (about US$8) per month.

inadequate funding and inherent system inefficiencies. Lack of direct linkage between hospital budgets and performance creates an incentive regime for managers that may lead to inappropriate hospital behaviour. Managers and doctors are not bound by the budget to produce a given quantity and quality of services, and therefore can afford to operate sub-optimally. This occurs at the expense of patients and society in general.

Second, hospitals retain all hospital fee income in a special fund called the Health Services Fund (HSF). Hospitals have the latitude to use this fund to finance non-salary recurrent expenditure targeted at improving the quantity and quality of hospital services. The introduction of fee retention was meant to encourage hospitals to collect more revenue. However, most people are eligible for free services and in order to maximise revenue, managers have to strengthen cost recovery measures. There is an incentive to increase service intensity for paying patients although this response has not been established empirically.

10.3.3 Qualitative results.

10.3.3.1 Case Study 1: Hospital 1

In this case study, in-depth interviews were held with 8 respondents: 4 hospital executive members and 4 line managers (see Table A10.1). No meeting was attended at this hospital because none was convened at the time of the study. Instead, a review of minutes of previous meetings was carried out.

Internal management structures: The hospital had a typical public hospital management structure as described earlier: a hospital executive and a procurement committee. An addition was what was called an efficiency committee composed of the administrator, matron, a doctor and a pharmacist. Its role was to regularly supervise departments, checking and discussing on resource use, wastage; pilferage and any other efficiency related issues. The activities of this committee were complementary to those of the procurement committee. The hospital had no active drugs and therapeutic committee and a hospital advisory board. Strikingly, most executive members were in acting capacities with no substantive medical superintendent, provincial pharmacist and hospital administrator. According to national policy these are key cadres in hospital management. Four out of eight respondents had some form of management training in addition to their basic professional training. The mean time spent working at the hospital by respondents was 5 years (7 months to 15 years). For instance, the matron had spent 15 years working at the hospital.

At the time of the study, the HE had held no meetings in the previous ten months. A review of hospital records for 1997/98 showed that HE meetings were irregular and ad hoc. The newly appointed medical superintendent attributed this to lack of a substantive hospital head (leadership) and the acting administrator (an executive officer) complained instead of uncompensated extra-responsibilities. The administrator is supposed to organise meetings as instructed by the head of the hospital. The outgoing acting medical superintendent argued that clinical work tended to take precedence over administrative work because of an acute shortage of doctors at the hospital. He said that inevitably affected the management of the hospital. The hospital's policy was that heads of departments (HODs) were supposed to meet once a month to discuss hospital-wide activities. Records and staff interviews showed that no such meeting had been formally convened for almost a year. Managers expressed concern that monthly meetings provided the only formal opportunity of knowing what was happening in the hospital and sharing experiences and problems with others. Given that no meetings were held, it seemed clear that management was not formally working as a team and the hospital assumed what could be called a *laissez faire* scenario in which individual managers simply executed their jobs with only their job descriptions for guidance.

Internal communication: Formal communication between the HE and staff in this hospital was lacking as reflected by what some respondents said:

> "Basically, it is not clear what procedures to follow in doing a lot of things here because there are no meetings."[1]

> "We just see new people here without communication or introduction. People are just transferred without announcements. [Some] staff [members] get houses [hospital accommodation] in an unknown way. Junior staff get better accommodation sometimes." [2]

All the respondents (8) indicated that internal communication was a problem. Three of them attributed this to what they viewed as an autocratic acting medical superintendent, and two said they used informal ways of communicating their concerns to the HE, and one said "to know [something] you have to insist." The consensus view amongst respondents was that for the hospital to function well there must be consultation and communication between hospital staff and the executive.

Internal HE accountability: Respondents were asked whether or not the HE was answerable for its actions. It was reported that HODs, sisters-in-charge and ward meetings were the traditional means of ensuring that management responded to staff needs and problems, and for members of the management team to provide feed back on a variety of issues. Because such meetings were infrequently held communication was poor, and respondents felt it was difficult to tell whether the executive was accountable or not. However, they perceived poor communication between staff and the executive as indicative of lack of transparency and accountability. Two suggestions were proffered on how to resolve the problems. First, regular consultation and informing people about major hospital-wide issues. Second involvement of line management in executive activities through co-option of HODs. Although the hospital had the necessary fora to foster accountability the frequency of use, the discussion content (as observed in the records) and exclusiveness of those structures was a problem.

Resource planning, use and accountability: Asked about their involvement in financial management respondents said it was traditionally the exclusive responsibility of the executive. They, however, acknowledged that the HE could only prepare budget proposals for the provincial directorate. HODs complained that as line managers they had no influence on the hospital's budget because they were not involved in the budgeting process. The administrator controlled hospital expenditure without support of the HE or the medical superintendent. What is interesting is that the hospital had no clear mechanism for tracing costs and therefore accountability of resource use. Departments drew resources from the same "pot" with no predetermined allocations. This was in conflict with attempts to improve the rational use of resources.

Input procurement and distribution: The purpose of this investigation was to explore how the hospital acquired inputs and distributed them internally. The hospital had a dormant procurement committee. A review of available records revealed that the committee rarely met (which the members admitted themselves) because there were no minutes of such meetings in the previous year. What was happening was that the pharmacist in concurrence with the administrator procured inputs upon request by departments. Wards and medico-technical departments procured inputs through the pharmacy since it held the medical and surgical budget. Departmental requests were made without prior knowledge of available financial resources and other hospital needs. Input supply was based on a first-come-first serve basis without an overall input procurement and distribution strategy. The absence of a rational resource use strategy meant that the potential impact of the efficiency committee's efforts was undermined. Most of the hospital inputs were procured from the central medical stores.

Incentives and disincentives: Respondents were asked to highlight what they perceived as incentives and disincentives and how these affected them. The following perceived incentives were reported: job security[79] (25%), availability of subsidised accommodation (19%), continuous professional education (CPE) (13%), patient diversity (13%), on-call allowances (9%), transport allowance (6%), job satisfaction (3%), good social environment (3%), fair salary for work done (3%), proximity to capital city (3%) and freedom in clinical decision making (3%). What was important was to identify those hospital-specific factors that were likely to explain differences in hospital staff behaviour across hospitals. These included access to subsidised accommodation, CPE, fair workload, the social environment and proximity to the city. It became apparent during the interviews that availability of monetary incentives were considered important factors in retaining staff. The importance attached to each incentive differed from respondent to respondent. However, the distribution of access to these incentives was fairly similar which raises the question of whether or not they motivated staff to enhance performance. Noteworthy is that most of the highlighted incentives were not

[79] Some quotes of the reasons why some staff felt job secure: " Because I am a doctor", "I am experienced and I have been doing this job for sometime now. Nobody can push me around", "Being a medical officer is the most secure job in this country. You can never be fired but maybe expelled", and "I am the only dental surgeon in this province."

particularly related to individual performance—they were perceived as entitlements. Only one respondent said promotion was based on competence, the rest said it was based on eligible (experienced) individuals applying for posts to the Public Service Commission (PSC). Most importantly, there was no evidence from management of use of (or attempts to use) potential "motivators" such as access to CPE and promotion as levers for performance enhancement.

Similarly, the majority of disincentives highlighted by staff are intrinsic to civil service. The responses included: low salary (28%), lack of a standardised CPE programme (16%), shortage of essential inputs (20%), poor perks (4%), bureaucracy (4%), lack of support from above (4%), hospital facilities in relation to the workload (4%), lack of recreational facilities (4%), overwork (4%), poor internal communication (4%), extra qualifications not rewarded by better pay (4%) and poor allowances (4%). Staff registered their strongest objection towards incessant shortages of inputs such as staff, drugs, equipment and other medical supplies. It would seem from these responses that the general complaints related to working conditions.

Respondents also said what was particularly demotivating was the fact that patients who could normally be appropriately managed at that level had to be referred or kept in hospital for longer periods of time for example, because of input shortages. One respondent's view was suggestive of despondency and low morale: "I feel I am just a dedicated person, otherwise there are so many factors that militate against my being here." Interestingly, only one member of staff viewed lack of internal communication as a disincentive. An unstructured CPE programme was perceived as a problem because there were no clear procedures for obtaining it. It seemed to be left to the whims of managers. This complaint could have arisen as a result of disproportionate allocation of CPE opportunities. One can only speculate that this may have been either due to favouritism or merit.

Staff views on coping strategies: All clinicians interviewed said they did private practice after hours to augment their income, and most other professionals said they did nothing to supplement their incomes because opportunities for private practice were limited in the small provincial town. One respondent said, "We are on-call almost 24 hours everyday, we just work as much as we can do." That is what the national policy dictates for all health cadres, which invites two questions: what time doctors did private practice; and what their objective functions were in the hospitals—the dual practice problem. The dual practice problem arises from the fact that it is unclear how doctors balance their time between private and public practice, and to what extent this affected patient referral patterns between public and private facilities and performance in the public hospitals.

On the question of high workload, four said they worked extra hours to cope. Three said the workload was manageable, and one said the hospital used student nurses. The respondents admitted though that use of students affected the quality of services. One respondent said, "We use supervised student nurses. There are more student nurses than qualified nurses at this hospital" and another said, "We have to put in extra-hours, and ask subordinates to do the same. However, we lose friends [in the process] because people do not want to work extra hours." Overall nursing managers said they reduced supervisory visits to wards during periods of high workload. The overall picture in this case is that respondents expressed willingness to work extra-hours. The triggers for such attitudes might be related to the informal nature of management at this hospital.

Staff tension: It was impossible to effectively explore the existence or non-existence of staff tension at this hospital because staff meetings were a rarity and if anything informal without recorded minutes. Records were scant and interviews did not yield much because most executive members were in acting capacity, and all respondents were unwilling to disclose any internal tensions. Although only one respondent highlighted the problem of autocracy in the management of the hospital, it appears reasonable to speculate that lack of meetings meant that a few members of the executive were making hospital-wide decisions. The administrator appeared to have some control of hospital activities in the absence of an active medical superintendent and executive. Nonetheless, control of various activities was much more dispersed with HODs in charge of departmental activities. By deduction, it appeared that the operational characteristics of this hospital had all the ingredients for misunderstandings and tension—poor communication, unclear resource allocation, opportunities for private practice for a few, and management without accountability.

Views on quality of services: All but one respondent admitted to the existence of quality problems at the hospital. Perceived quality problems were chiefly structural in nature: shortage of beds and space (29%), staff (29%) and drugs (14%), premature patient discharge (14%), and patients not bathed (14%). One nursing manager alluded to process quality [humanity and empathy] problems, "lack of appropriate staff attitudes and use of refined language to communicate effectively with sick people." Another said, "Sometimes burns patients become septic because they are not turned regularly." The hospital was viewed as small for its workload: "The hospital was built for 50 people and now is catering for 300 patients."

These problems were attributed to lack of adequate staffing, financial and material resources (50%), lack of supervision (13%), deficient infrastructural facilities (25%) and problems related to input procurement like delays (13%). Asked what their role was in solving these problems, the majority of the respondents felt that the constraints were outside the hospital's realm of control, and a minority felt doctors were not quality conscious. A number of suggestions were given on how to improve the quality of services: increasing resource allocation, more supervision, staff training in supervision and management, executive to plan and communicate with resource users, and streamlining procurement of essential inputs. Despite awareness of quality problems, there was local inertia, which marred the potential of hospital retained revenue, in resolving some of the input constraints.

Views on hospital costs: Six out of seven respondents (86%) recognised that hospital costs were indeed a problem, and they attributed the problem to rising input costs (83%) especially for drugs and medical supplies, and that little was recovered since most patients do not pay for services (17%). They argued that problems remained unresolved because clinicians, as the main resource users, were unaware of costs, and because of inadequate financial support from government. The administrator felt that sharing of the hospital budget between hospital and teaching services made cost control difficult.

Asked whose responsibility it was to control costs: 3/8 said hospital administrator, 1/8 said HODs and administrator, 1/8 said everyone, 1/8 said the HE and 2/8 said the finance committee. It appears most managers felt it was the responsibility of someone else (or committee) to control costs especially the administrator, and not their own responsibility. Lack of an identifiable locus of cost control might explain why costs were perceived as invariably increasing.

Views on hospital autonomy: A need for hospital autonomy was recognised by all citing potential improvements in the decision-making system (5/7), and procurement of inputs and transport services (1/7) as the main reasons. Respondents felt autonomy would reduce problems of central procurement and control, as one respondent agreed:

> "..to reduce bureaucracy and improve decision-making. The CMED[80] and government medical stores are causing problems because of centralised procurement, like now we do not have paracetamol because we cannot [are not allowed to] get it from the private sector. These organisations [CMED and GMS] do not operate in a competitive environment."

Two respondents professed ignorance on what the consequences could be of making hospitals autonomous. However, there was some degree of scepticism that reforms might not bring the desired effects, if they were not appropriately implemented. Reforms were widely recognised amongst the respondents as necessary. Four respondents did not anticipate problems with hospital autonomy as long as adequate resources and guidelines of how things should be done were provided. Inadequate management capacity was identified as the main problem that needed to be addressed first through staff training. It is clear from these comments that the existing decision-making context and its associated disincentives was viewed as a constraint. However, the fears raised of managerial inadequacies under reform, and the need for clear guidelines is an acknowledgement that there were managerial capacity problems that could be related to current performance. Autonomy meant extra-responsibilities which HODs and the executive could not manage without further training.

[80] CMED stands for Central Mechanical and Equipment Department. This is a department in the Ministry of Transport that manages all government vehicles.

Views on contracting out of services: The hospital seasonally contracted out laundry services especially in winter when the local drier was ineffective. Only three of the respondents knew about the contract and the rest either said no hospital service was contracted out or they knew nothing about contracting. Even the outgoing acting medical superintendent was unfamiliar with the laundry contractual arrangements. Only the hospital administrator knew about the contractual arrangements for obvious reasons. The rest of the respondents lacked basic knowledge about use of contracts, their merits and demerits. The administrator was convinced that the laundry contract was "a good deal" because "...the hospital operates on to-best-advantage (TBA) terms and changes contracts if need be." Nursing managers believed that contracting out was costly considering that the hospital paid for cleaning, transport and staff who did sorting and linen mending. They also highlighted the complexities of contracting out services like cleaning, catering and security services such as timeliness of ward cleaning, special diets for some patients and controlling thefts.

Staff views on contracting out tell us two things. First, is that there was limited involvement of other HODs in making hospital-wide decisions. Second, in-house production of services was a preferred option of producing services because it was perceived to be less costly and likely to be of better quality. However, the fact that respondents were able to identify costs and quality as problems (or potential problems) reflects their level of understanding of these two performance parameters.

10.3.3.2 Case Study 2: Hospital 2

A total of seven respondents: two executive members and five heads of departments were interviewed (Table A10.1). No meeting was attended at this hospital and minutes of management meetings held were reviewed.

Internal management structures: The hospital had all the expected management structures (hospital executive, procurement, finance and drugs and therapeutic committees, and a hospital advisory board) and all of them were operational. The hospital executive, interdepartmental, sisters-in-charge, and hospital advisory board meetings were regularly held to discuss various issues within their mandates. The HE had full and substantive membership: matron, medical superintendent, health services administrator, provincial pharmacist, and the principal nursing tutor. The hospital advisory board, finance, drugs and therapeutic and procurement committees were regularly convened. Five of the seven respondents had received some form of management training (ranging from basic to executive management). The average respondent work experience (in the same post) at the hospital was 5 years (8-108 months). The majority of the respondents had in excess of 10 years working experience in the civil service.

Internal communication: Five out of seven respondents claimed there was poor communication between the hospital executive and staff. This is unexpected given that all management structures were working. One respondent said, "Communication was disjointed and people do not know the hospital policy, and they do not know current information." Even clinicians complained of non-involvement, "There is not much communication because we see changes in which we were not part of in initiating." A possible explanation to this could be that the content and quality of discussions held in non-executive meetings were not informative enough. An analysis of minutes of meetings showed that a wide range of mostly operational issues was discussed with a wide spectrum of participants (except doctors). The medical superintendent supposedly represented doctors even though there was no evidence of feedback meetings with the rest of the clinicians. The negative responses seem to reflect the lack of policy relevance of what was discussed in those meetings.

Internal HE accountability: There were mixed feelings about executive accountability to its subordinates. Some respondents felt it was difficult to assess the accountability of the HE. The argument was that, "It is not easy to evaluate your manager. For example, poor services, [and the] budget finishing early. It is easy to blame subordinates on the ground. Why is it that resources are not used effectively? It is difficult to establish the root cause" One needs to have a closer link with management" or that "They are answerable, [but] indirectly they do not mention mistakes." Both responses seem to suggest an atmosphere of mistrust, and absence of transparency. However, executives argued that interdepartmental meetings were used for consultations and feedback on decisions taken on specific issues. These disparate views allow us to speculate that though meetings were held as expected the discussion content may not have been sufficient for HODs to feel that they were adequately consulted and informed about hospital-wide policy issues.

Resource planning and use: There was no evidence of involvement of HODs in planning and budgeting for the hospital. That was viewed as the role of the administrator. The administrator was also responsible for controlling expenditure using monthly expenditure thresholds and approval of requisitions for various items from user departments. In so doing, she indirectly allocated resources across departments. Apart from pharmacy and catering no other department had a specific vote to manage. By design, the system was incapable of checking who used what, how much and for what. There were no local initiatives to address the problem. No working departmental budgets were used to track expenditure patterns by source. A finance committee made up of the administrator, a HAB member, medical superintendent and the matron controlled and sanctioned use of Health Services Funds. On the whole the administrator was responsible for controlling aggregate expenditure but was not able to pinpoint leakages or inefficiencies in the system.

Input procurement and distribution: The hospital used public methods of procuring inputs when using government budget. The administrator was assisted by the procurement committee in procuring inputs whenever necessary. There was much flexibility in using the HSF because management could easily purchase items from the private sector if it was expedient to do so. The fund was used as a backstop in case of disruption of the bureaucratic procurement system. At the time of the study the hospital was relying much on the HSF for the purchase of patient food and other domestic expenses. The interviews showed that the smooth operational linkage between the finance and the procurement committee was instrumental in meeting local daily demands of the hospital. Decisions on the purchase of inputs were made much quicker.

Incentives and disincentives: The responses provided are categorised as follows: social factors (20%), job security (12%), subsidised accommodation (12%) and food (12%), free health services (12%), opportunities for private practice (8%), leadership challenge (4%), CPE (4%), transport allowance (4%), job satisfaction (4%), proximity to the capital city (4%), and provisions for car loans (4%). 'Social factors', encompasses factors such as that staff had their families residing in the locality and had access to educational facilities. The hospital is close to the capital city, and staff can commute daily to and from the capital. The majority of these incentives relate to the working environment which most of them shared. There is no relationship between access to these incentives and performance. When public staff compared themselves with their private sector counterparts, they believed there was no reason or motivation for any member of staff to work beyond the average work effort. People tend to prefer to be treated equally.

Disincentives raised were related more to the civil service in general than to the hospital specifically: low salaries (54%), lack of support from above (8%), recreational facilities (8%) and accommodation (8%), high exposure to infectious diseases (8%), bureaucracy (8%) and a system that does not value people (8%). The first and last responses are particularly interesting because they expose the relevance of a system that recognises and rewards individual performance, which is fundamental in motivating people. Monetary incentives topped the list of responses. This probably reflected peoples' general perceptions of the value of their work effort in the public sector, which they compared with the private sector.

Staff coping strategies: Five people responded to questions related to how they coped with low incomes, and two refused for unknown reasons. Of the five, two said they worked at local private surgeries, and three said they engaged in informal income generating activities such as buying and selling goods, and knitting. No evidence on how respondents balanced working time between official duties and personal duties was obtained because of the sensitivity attached to such information.

Several strategies were reported for coping with high workload: working extra hours (5/7), use of student nurses (1/7), reducing the number of laboratory tests done and sacrificing management for technical work (1/7). Respondents pointed out that working extra hours always carried the risk of lowering the quality of services especially patient-to-staff relationships— "..people [are] not treated as people but as cases, as staff aim to clear queues." These results suggest a general willingness to provide adequate health cover but sometimes at the expense of quality.

Staff tension: To unearth underlying tensions and to capitalise on critical incidences requires considerable time investment in studying the hospital environment. During the time of the study at the hospital no evidence of conflict was identified through discussions with managers, review of minutes and daily observations of the dynamics of hospital activities. The general impression was one of "operational harmony". It appears the reason for this observed harmony was the proactiveness of HODs in preventing overt tensions through discussions on potential sources of conflict such as resource use amongst themselves. For instance, the pharmacist emphasised the importance of the drugs and therapeutic committee in ensuring rational drug use. Furthermore, the pharmacist regularly advised clinicians on the drugs supply situation. The hospital laboratory technologist said requests for investigative tests by clinicians were constantly monitored, and if need be, discussions were held with individual doctors on particular cases. The administrator worked in close liaison with the medical superintendent who had an explicit sense of control of the hospital. As Harris (1977) argues in the context of US hospitals, there seemed to be a complex system of avoiding breakdowns in the internal allocation system.

Quality of services: The majority of respondents (5/7) perceived quality of services as a problem, one did not and another could not answer. The problems (responses) were outlined as staff shortages (36%), poor nursing care (18%), shortage of beds and ward space (9%), equipment shortages (9%), drug shortages (9%), poor staff-patient relationships (9%) and poor timing of procedures (9%). The responses to the causes of these quality problems were: lack of staff and financial resources (55%), low staff morale (22%), lack of supervision (9%) and free health services (9%). Respondents argued that the problem was worsened by the fact that most people did not pay for services, and cost recovery was low. On being asked why these problems were not addressed, the blame was put on government for not committing enough resources for hospitals. Whilst this might be true, there were no local initiatives to address these problems.

Suggestions were offered as to how quality problems could be resolved: government to increase its financial allocation (38%), increasing supervision (25%), staff training in management and supervision (13%), promotion of teamwork (13%), increasing hospital revenue by asking patients to pay (13%). Managers at this hospital seemed to have a consensual vision of what needed to be done within and outside the hospital to improve quality of services. Nonetheless there was no evidence of any concrete steps taken to address some of the problems.

Service costs: Fifty seven-percent (4/7) of the respondents said costs were a problem, and the rest (3/7) professed ignorance on the subject. The problem was attributed to increasing input costs and lack of staff motivation to control costs. They felt the reasons why costs could not be contained were that most clinicians were not particularly worried about costs, frivolous use of services and lack of appreciation of individual efforts by the system. One respondent summarised the problems by saying that, " people are not motivated to control costs. Departments should ensure that disposals or wastage do not exceed 7%[81], and reduce repeat tests. Doctors are the main culprits, they demand x-ray even for review [TB] patients." To redress the problems it was suggested that there be a change in the funding policy of hospitals, patient education and greater communication within the hospital.

All respondents felt that it was the responsibility of the hospital administrator to control costs. The administrator admitted that it was her role to monitor monthly expenditures but what is surprising is that there was apparently no mechanism for the administrator to effectively do so. At departmental level, line managers acknowledged attempts to use

[81] The respondent was further asked why 7% and how it would be measured. He said that he was taught this figure at school. The crucial point here seems to be that wastage should be reduced to the minimum.

resources effectively and reduce wastage. For instance, the head of laboratory services cost control activities included—"Justify[ing] every diagnostic test and narrow[ing] down tests to what is essential." The idea of departmental budgets was perceived as a good one in creating cost consciousness amongst managers. However, some problems were anticipated: they felt that departmental budgets would complicate daily operations and increase managers' workload. For devolved budgets to work properly, staff needed to be trained in budgeting and cost control.

Views on hospital autonomy: Five of the seven respondents recognised the need for change in hospital governance, whilst the rest either thought otherwise or were sceptical of such a change. Self-governance was perceived as an option to reduce bureaucracy. One respondent argued: "Local people know their problems and urgencies rather than someone making decisions for them." A number of potential problems (or fears) associated with self-governance were raised: (1) financial insecurity, (2) difficulties in infrastructural development because that has been the role of the Ministry of Health, (3) potential abuse of power through corrupt practices such as nepotism and victimisation, (4) mismanagement due to lack of capacity, and (5) that self-governance might disrupt staff career structures. Solutions given for tackling these problems included enhancement of hospital management capacity, establishing audit systems as safeguards against perverse and opportunistic behaviour, asking people to pay for services and monitoring from headquarters. The diversity of views expressed by respondents reflects differences in understanding what autonomy entails in practice. In this case study autonomy was viewed as total disengagement from government, as reflected by the potential problems raised. Whilst some of the fears are true, others reflect general public worker tendencies to avoid absolute responsibility or accountability.

Views on contracting out of services: Laundry, security and equipment maintenance services were contracted out to private providers at this hospital. All the respondents knew about the contracts, but all except the hospital administrator had little knowledge about how they worked. However, other respondents were able to express their views on operational problems associated with the existing contractual arrangements. First, they felt contracts were costly compared to own production: laundry services for example.

Second, they said the quality of laundry services was not good (delays in delivery, stained and torn linen, and linen losses). Third, they said infection control was difficult when linen was laundered outside the hospital. Contracting out services was generally not perceived as a good idea. The concept of quality and value for money resonates from the respondents' comments. Despite these comments, any changes, however, that would make managers more accountable for costs and quality in a transparent way as in contracts (e.g. devolved budgets) were seen as extra responsibility and complicated. Although respondents saw the advantages of organisational change there was a general reluctance to forego the benefits of unclear accountability structures.

10.3.3.3 Case Study 3: Hospital 3

Respondents in this hospital included three executive members and seven heads of departments (see Table A10.1). Two hospital executive meetings were attended and minutes of other types of meetings were reviewed.

Internal management structures: The hospital's management structure was similar to other hospitals: a hospital executive, heads of department and two active committees—finance and procurement. The hospital advisory board was dormant, and there was no drugs and therapeutic committee. The HE had full membership. The medical superintendent was newly appointed. The previous medical superintendent had been demoted to a GMO because of managerial incompetence[82]. Seven of the ten respondents had received some form of management training (from short course to graduate level), and their average work experience at the hospital was 6 years (1 month to 16 years). The activities of the executive were recovering after a spell of dispersal and lack of co-ordination. Under the reign of the previous medical superintendent management meetings were rarely convened. The interviews confirmed that management was uncoordinated.

[82] The medical superintendent had an alcohol problem, and neglected his duties. As a consequence the hospital was a regular target of the local media and people complained about the quality of services. The management team was characterised by severe tensions and conflict.

Internal communication: Communication within the executive, and between the executive and HODs was described as limited because executive and interdepartmental meetings were infrequent (7/10). Heads of departments felt excluded in making hospital-wide decisions. The credibility of the executive was questioned: "..many people in the executive, do not seem to have a good footing. Information comes in bits and pieces through the matron." Further discussions with the longest serving members of the executive (administrator and matron) revealed that few formal executive meetings were held. Instead ad hoc meetings were common with the relevant members depending on the issue to be discussed. The hospital administrator liased directly with HODs on matters that concerned their departments, and with executive members on matters that concerned their management portfolio. The administrator became the interlocutor of hospital activities instead of the medical superintendent. The few meetings that were held were usually as a result of critical incidences like shortage of patient food or critical drugs. Rather than playing a preventive or general management role, the HE appeared to be "fire fighting". One nursing manager expressed dissatisfaction with the work of the executive as, "Things are done by trial and error, people seem not interested or have no priorities. To survive [here] you need to be hot-headed."

Nursing managers said they used sister-in-charge meetings, chaired by one of the matrons, to raise issues and try to influence hospital-wide decisions. They felt that because HOD meetings were not convened regularly, transparency and teamwork was jeopardised. Specialist consultants felt ill-informed about general hospital activities: "There is not much communication between me and the HE. I have lost interest in them." It seems that both structures for formal lateral and vertical communication were dysfunctional.

Internal HE accountability: Accountability was perceived as a problem at this hospital because of lack of communication and involvement. Most respondents felt that there was no transparency in the way the hospital was managed. For instance, some said minutes of HE meetings were not circulated to all the departments, and were worried that accountability could not be achieved without teamwork: "..because of lack of transparency and openness, there is no togetherness, so it's difficult to tell [how accountable the executive is]." It appears that lack of teamwork at executive level disgruntled subordinates such that staff developed negative attitudes and suspicion towards it. This is a clear example where internal management *per se* can have a direct and detrimental effect on hospital behaviour and hence hospital performance.

Resource planning, use and accountability: The problem of lack of communication was particularly severe at this hospital such that none of the seven line managers had an idea of how resources were budgeted and allocated to various hospital activities. That was perceived as the role of the HE who managed the budget and hospital services fund. The finance committee was not operational, and therefore the administrator and the medical superintendent used their privileges as signatories to the HSF account. From the executive's point of view no financial resources were designated to specific departments and this made it difficult for departments to account for resource use. The nursing school and various other departments drew resources from the same source. It was not feasible for administration to account for resource use by department but globally. The situation meant that HODs could do whatever they wanted and still be unidentifiable even in cases of gross inefficiencies.

Input procurement and distribution system: The pharmacy department procured medical and surgical supplies for medical and non-medical departments through requests. Procurement of inputs was subject to national guidelines, which required hospitals to procure inputs from the GMS, and from the private sector only with the approval of the GMS. The administrator alluded to the use of HSF for fast track procurement of drugs from the private sector. National tender procedures were followed when estimated input costs exceeded given thresholds. The procurement committee's role was to put out tenders and subsequent adjudication of tender submissions. The hospital had no global policy on internal input distribution or any local initiative to promote efficient use of inputs.

Incentives and disincentives: Most respondents felt that access to CPE was a strong incentive for them to work at this hospital (44%). Opportunities for further training were said to be high, and were often government funded. Access to free health services

(19%), and other social factors (19%) such as family local residence, job security (6%), subsidised accommodation (6%) and leadership challenges (6%) were reported as some of the incentives. What is particularly interesting is that most of the incentives mentioned apart from salary are institution based and could be affected locally. Some concern was raised concerning the distribution of access to training workshops, "Only specific people go to workshops where there are financial benefits, and such opportunities are not shared". It was not clear, however, whether or not this distribution pattern was related to performance, in which case CPE was a performance enhancing reward. In one ward, the sister-in-charge gave individual nurses annual prizes for good performance. That type of incentive was more likely to make people work harder because it was linked to performance and everyone in the ward perceived it to be so.

Respondents raised a number of disincentives they faced: low salaries (33%), shortages of essential inputs (19%), poor internal communication (10%), in-fighting amongst managers (10%) and overwork (10%), no call allowance for administrative staff (5%), unrealistic patient expectations (5%), unclear career structure (5%) and unavailability of CPE (5%). What is of particular interest is that, most of the cited disincentives apart from salary are also institution based and can be addressed locally. It is these factors that assist in explaining relative performance levels.

Staff coping strategies: Respondents were asked how they coped with the problem of high workload and low salaries. Six of them said they worked extra hours, two said, "I do what I can" and one said, "I do what I can within specified periods." Nursing managers were concerned about the quality of services rendered when staff is over-stretched:

> "The ward is usually full. We have 39 beds but often we have 40-52 patients, with floor-beds. It becomes difficult to give patients time because of high workload." [1]

> "For example we ask night staff to do bed preparations because in the morning we will be too busy. One person does two things at a time, shared attention can then affect care." [2]

Asked how they coped with low salaries, five (50%) of them said they did private practice. This included doctors, radiographers, nurses, pharmacists and laboratory technologists. The rest gave various responses: doing nothing, informal jobs (knitting, buying and selling goods), conducting research, securing bank loans and relying on spouses' income. This hospital is located in a large city where opportunities for private practice are abundant. The study was not able to gather evidence of how staff balanced their time between public and private practice because respondents were reluctant to divulge this sensitive information. The general comment was that they did private practice when on leave days or after-hours which was expected.

Staff tension: The administrator was powerful in that she shouldered most of the key decisions and interacted with provincial managers and HODs more than any other HE member. Her position was strengthened by the ineptitude of the demoted medical superintendent. The situation prompted one consultant to suggest that the entire HE needed to be changed because it was inefficient, and he had lost faith in it[83]. That view was echoed by one of the nursing managers. Such comments show that there was overt tension between clinicians and administration even though the administrator was perceived as influential. The new medical superintendent admitted that most doctors at the hospital were not informed about hospital management and budgetary allocations. It would seem that this lack of knowledge or information created tension.

The problem was more visible among nursing managers who felt that the power struggle between their top managers (Matron I, II and III) was stifling their work. Each vied to be in total control of hospital nursing activities. To gain control each one of them did not respect decisions made by the others even though Matron I was the overall manager. Consequently there was discontinuity of activities when Matron I was not available. For instance, it took three days for the author to convene a meeting with one of the matrons because each one of them wanted to be interviewed, and was therefore not willing to provide information about the whereabouts of the other. Management at this hospital was characterised by lack of teamwork, poor internal communication and ineffective use of management structures.

[83] " The whole hospital administration needs to be retrained or replaced completely. There is overstaffing and people are not productive."

Quality of services: The majority (70%) of respondents acknowledged the existence of problems in the quality of services provided, but three respondents (30%) felt that service quality was acceptable[84]. The problems were reported as: staff shortages (27%), poor staff-patient relationships (18%), poor equipment maintenance (18%), drug shortages (9%), poor laundry services (9%), delays in laboratory tests results (9%) and old equipment (9%). The results show that the majority of respondents were aware of both structural and process quality problems in the hospital. These problems were attributed to lack of financial and human resources (42%), low staff morale (25%), lack of supervision (8%), inefficient input procurement systems (8%), absence of nursing care protocols (8%), and unfavourable nursing career paths (8%). Unfavourable nursing career path meant that good nurses could only be promoted to administrative roles, and not other roles that kept them practising nursing.

The main solution to quality problems given by respondents was that the government should give the hospital more funds. Other solutions included increasing supervision, training of staff in management and supervision, promoting teamwork and staff motivation. Respondents felt that it was the responsibility of the HE and HODs to address these problems. The interesting thing is that even though workable solutions to these problems were readily provided, there was no evidence of attempts to put them into practice.

Hospital costs: It was a majority view that costs were a problem at this hospital. Chief among the causes raised was increasing input costs, particularly for drugs and medical supplies (50%), lack of staff motivation to control costs (20%), expensive treatment practices such as poly-pharmacy (20%), and expensive service contracts such as for laundry services (10%).

The problem of escalating hospital costs was perceived as externally driven. Respondents argued that the government was allocating inadequate funds to cover costs. Managers of medico-technical departments such as laboratory and radiography felt that

[84] One of the three respondents said, "I do not see any problems with the quality of care we provide especially in the gynaecological ward, we have no waiting list."

it was difficult for them to control costs because their services were driven by doctors' demands, whom they argued were difficult to control. They reported that sometimes they got orders from doctors and other government agencies (e.g. police/prisons) to do what they perceived to be "unnecessary" investigations. This made it difficult to plan and control resource use in the respective departments.

Asked why the problem of increasing costs was not being addressed, one executive manager gave this response, "People are generally not concerned with maintenance even of their own health, that is why they come too late to hospital. They become concerned when someone dies or the machine breaks down. Their level of tolerance is high and therefore their reaction threshold is long." The essence of this response is that a culture of prevention management was absent at the hospital.

Although there seemed to be lack of motivation among staff to control costs, the problem was perceived as a collective responsibility. Respondents reported their own initiatives in curtailing cost escalation: effective use of resources and supervision (4/13), reducing ward wastage by (3/13), prioritising activities and expenditure (2/13), use of ward stock cards and checklists (2/13), and controlling clinician demands for tests, x-ray and blood products (2/13).

Use of functional budgets was perceived as a workable idea in controlling costs (5/8). Respondents spoke of creation of awareness: "[With a departmental budget] I can plan according to need, ensure priorities in the department are addressed, rather than be considered globally. However, there is need for training to ensure that resources are used properly." Some managers expressed reservations on the practicalities of implementing such budgets considering that departments shared resources between them.

Views on hospital autonomy: The majority of respondents saw the need for autonomy (5/8), and a minority felt otherwise (2/8) or were sceptical about it (1/8). As expected, the main reason given for wanting autonomy was reduction of bureaucracy. Other reasons given were that autonomy would make the hospital collect more revenue and use it appropriately, and it would become easier to identify performers and non-performers. The few sceptics spoke of lack of evidence that such reforms work, citing Zambia as an example, where they argued reforms did not bring much change, and that there was no management capacity to cope with autonomy. Generally, there was enthusiasm for hospital autonomy but it was its design that bothered the respondents: "Yes, if autonomy means operating as a company where people are accountable for their actions, and there is no bureaucracy, and no room to lie and cheat as is the situation now."

Respondents highlighted major challenges of self-governance such as: (1) lack of managerial capacity by current executive and the proposed management boards to shoulder increased responsibilities (4/10); (2) hospital financial sustainability since the majority of users were eligible for free services (3/10); (3) potential for abuse of power and corruption (2/10); and (4) political interference should things go wrong under self-governance (1/10).

Suggestions were made as to how these potential problems could be avoided or managed. They spoke of the following: that people should pay for hospital services (3/10); hospital managers must be trained in non-traditional areas of work such as management, book keeping and staff development (2/10); staff to remain under the PSC (1/10); use of external advisors (1/10); involvement of senior staff in management (e.g. consultants) (1/10); state to totally relinquish all budgetary controls (1/10); and one respondent had no suggestion. Conservative respondents emphasised the need for advisors on a regular basis, and that staff should remain under the PSC.

These views may be interpreted to mean that whilst respondents were pro-hospital autonomy, any aspect of it that exposed them to total accountability and responsibility was a source of apprehension. It is therefore not surprising that management capacity was viewed as requiring further training in order to be able to assume the extra responsibilities.

Contracting out services: The hospital contracted out laundry services, equipment maintenance and cleaning of hospital grounds to private providers. Eight of the ten respondents were aware of such contractual arrangements but with limited knowledge on how such contracts worked in practice. This is partly explained by the fact that contracts, in this hospital were not managed by the hospital itself but by the provincial directorate. This contractual arrangement had problems, because those involved in the day-to-day interaction with the contractors had little influence on the nature of their relationship because any threats for poor performance could only be made through the provincial directorate. However, this management arrangement may be a reflection of how the provincial executive viewed the hospital's management capacity.

Nonetheless, hospital managers were able to discuss practical problems they encountered with existing contracts. 50% (5/10) thought the quality of laundry services was questionable. They complained that linen was stained, torn and there were regular delays in the supply of clean linen. 30% (3/10) said there was only one laundry company (Topline) in the city capable of handling hospital linen, which meant that the hospital had no alternative provider whatever the performance of this company. One senior manager strongly felt that the laundry contract was not a good idea: "That contract is a disaster, we need our own laundry." It is interesting to note that the majority of respondents were concerned more about quality than costs. This is likely because the contract was managed elsewhere.

10.3.3.4 Case Study 4: Hospital 4

The results for this case study are based on in-depth interviews held with ten different managers (4 were executive members—see Table A10.1). This hospital provided a conducive environment for implementing the study because it was perceived as a self-evaluation exercise by the executive management team. Three meetings were attended: hospital executive, hospital advisory board and sister-in charge meeting. Records of minutes of previous meetings were also reviewed.

Internal management structures: The internal structure of the hospital was not different from the other hospitals. The hospital had executive, finance and procurement committees, which were functional. There was no drugs and therapeutic committee. Interdepartmental meetings were convened as expected and the HAB was functional. The organisation of services was essentially the same as the other hospitals—functional departments managed by a head. Two of the ten managers had managerial skills (training), and the average work experience of the respondents in current posts was 4 years (2-144 months).

Internal Communication: Communication within the executive, between the executive and HODs and among HODs was not perceived to be problematic because all formal mechanisms for information exchange and participation were functional. This was confirmed by a review of administrative records, which indicated that such meetings occurred. The author had the opportunity of attending a hospital executive, an interdepartmental and a hospital advisory board meeting during the study. The executive also held several impromptu meetings to deal with emergencies. From this perspective, it would seem that there was teamwork within the executive as evidenced by regular consultations on a variety of issues. The medical superintendent was fairly new in that post but had been working at the hospital for five years as a general medical officer. The previous medical superintendent had been demoted to a general medical officer. According to other executive members, this demotion was prompted by poor managerial performance. They reported that the former head of the hospital lacked leadership and management skills but was a good clinician. The general shortage of doctors has led to junior doctors assuming managerial posts without the relevant experience.

Internal HE accountability: While there was no identifiable evidence of mistrust within the management team, complaints about the hospital were expressed regularly in the local press. Executive committee members argued that sometimes staff opted to use the press to complain instead of internal grievance and complaints procedures: "We always strive to respond to subordinates problems but sometimes subordinates use other methods, for example the press, to express their dissatisfaction or complaints." This maybe interpreted to mean that communication between the executive members and subordinates was not working or existing mechanisms for communications were not considered to be effective. Nonetheless, the hospital had public relations officers, and suggestion boxes as means for promoting transparency and participatory management. Apart from these few cases, non-HE managers felt the executive was accountable for its actions, and regular meetings provided opportunities for wider discussions and feedback—managerial participation.

Resource planning, use and accountability: The hospital used a typical public system of resource planning and allocation discussed earlier and there was no evidence of other innovative ways of ensuring resource use accountability. All respondents felt it was the role of the hospital administrator to allocate resources to departments and to account for those resources. However, they also highlighted the role of the finance committee in deciding upon use of the HSF. The perception that resource use accountability was the administrator and not users' responsibility implies negative (or uncaring) staff attitudes towards costs and cost control activities. It seems inconceivable, under the circumstances that the administrator could effectively control resource use without some form of devolved budgets. The existing system was incapable of identifying staff engaging in inefficient.

Input procurement and distribution: The hospital used traditional bureaucratic input procurement systems—use of the GMS. A procurement committee chaired by the administrator was responsible for approving input expenditures beyond government prescribed limits. There was much flexibility in the use of the HSF because the resources were not tied to specific line items and strict expenditure approval processes. There was no systematic process of distributing inputs within the hospital, and supply depended upon departmental requests. In the regard the hospital could be described as bureaucratically compliant.

Incentives and disincentives: Various issues were raised by staff as incentives: opportunities for CPE (25%), subsidised food (19%), availability of social services (19%), and free health services for the family (25%), job security (6%), and vested interests in the area (e.g. private practice) (6%). However, the majority of the managers argued that most of these incentives were insignificant especially when compared with the private sector. Incentives expressed related most to staff morale and individual wellbeing and were not linked to performance. There was no evidence to suggest that access to and distribution of the cited incentives was linked to performance. In addition, most of these incentives fall into what organisational theorists call "maintenance factors" which are associated with the physical working environment.

Discussions on disincentives were always animated, and several issues were raised. Chief amongst them was low staff salary (40%). Shortages of staff, equipment, medical supplies and drugs added to their frustration (27%) and so did poor infrastructure (7%), lack of CPE (7%), lack of staff accommodation (7%), lack of call allowances for administrative staff (7%) and lack of valuation of individual efforts (7%). In relation to the last factor, an infection control manager said "I am never taken seriously in whatever I do." The feeling of discouragement was apparent amongst the respondents—"We are just working, what can we do" one said. This example points to how working culture may influence individual behaviour and hence performance.

Staff coping strategies: The hospital workload was reported to be high relative to available staff capacity. Only three respondents said they worked extra hours to cope with the extra workload. The rest said they worked as hard as they could but within their specified shifts: "We just work as much as we possibly can" [1], "We simply work our hearts out" [2], and "I always work under pressure" [3]. Working time was perceived as a constraint because of lack of willingness by staff to work outside prescribed working times.

Asked about how respondents coped with low income only two admitted that they did private practice, and/or informal jobs. Those who did private practice perceived it as good coping strategy: "I did one locum last year in the private sector and it was so satisfying. The working conditions were good and I enjoyed myself." The rest either said their job was a calling or they did nothing about it. Others said, "We just soldier on. We [just] have to do it. We have no choice at the moment." This was a particularly sensitive subject to discuss with respondents and their openness required time to nurture. The veracity of their responses can only be viewed from that perspective.

Staff tension: Respondents were asked how they perceived their working relationships with the medical and/or administrative staff. Clinicians felt the administrative group was weak: "We have a weak administrator, and so we rarely have conflicts." This implies some form of medical staff dominance. However, administrative staff had a contrasting view: "The previous medical superintendent wanted to use HSF to repair cars and purchase mobile phones and I refused. We had to go to the provincial medical director for mediation. Later it turned out that the doctor was now the one calling for cost consciousness." This critical incidence serves to show that breakdowns in the working relationships between the medical and administrative group occurred in this hospital, and resource use appeared to be the prime source of the problem.

Quality of services: The quality of services at this hospital was perceived to be below acceptable levels. Quality problems raised (responses) included: shortage of staff (23.0%), lack of specialist cover (15.0%), shortage of drugs (7.7%), equipment (7.7%), beds and space in the casualty department (7.7%), poor patient-staff relationships (7.7%), laundry services (7.7%), patient diet (7.7%), environmental hygiene (7.7%) and poor specimen collection (7.7%). Clinicians felt strongly that lack of specialist consultants at the hospital affected the quality of medical services: "Yes, on the medical side, lack of specialist cover is a problem, sometimes we end up doing things that we are not confident of." The problems were attributed to a variety of causes: lack of human and financial resources (25%), lack of supervision (17%), pressure of work (17%), old equipment that regularly broke down (17%), low staff morale (8%), difficulties in disciplining staff (8%), and the absence of specialists (8%). Like in other case studies, most of the reported problems and causes were structural in nature.

Asked why the problems remained unresolved, the following reasons were given: inadequate financial support from government (30%), problem beyond the hospital's control (20%), and that staff attitudes take time to change (10%). The rest of the respondents (40%) could not say why problems remained unresolved. Nonetheless, respondents suggested local solutions to some of the problems: encouraging doctors to be quality conscious in their decision making, learning to improvise, improving staff supervision, reporting quality problems to the administration, and promoting appropriate prescriptive (for instance, through the revival of the drugs and therapeutic committee), and admission habits. The general picture portrayed by these results is that of a management team that knew what quality problems existed but felt physically constrained to resolve them.

Hospital costs: 70% of the respondents acknowledged that costs were a major problem at the hospital. Cost escalation was seen to be a result of increasing input prices (70%), wastage and pilferage (10%), lack of local specialists resulting in increased transport costs due to unnecessary referrals to Harare (10%), and increased demand for services due to HIV/AIDS (10%). Consequently, the hospital experienced regular input shortages. At the time of the study, the hospital had serious financial problems. There were no funds for patient food, drugs and other medical supplies because of monthly over-expenditure[85]. For instance, expenditure of the medical and surgical vote was two months ahead, and the provisions vote was one month ahead. According to this expenditure pattern the hospital was to run out of funds within the first seven months of the year. The HE decided to intensify collection of fees by asking everyone to pay unless the administrator saw fit to exempt them. This was against the national user fee policy. It was perceived that emergency measures were necessary to avoid patients' going without food and essential drugs for some time. The problem could not easily be solved because the hospital had only received ZW$11 million in 1998/99 FY compared to ZW$21 million in 1997/98. The short-term solution was to strengthen cost recovery. The respondents felt that it was the responsibility of the administrator, and the hospital management team to control costs. Some suggestions were made for tackling the problem, namely: more supervision to ensure effective use of resources, ward stock control, medical superintendent to check hospital expenditure every month, reducing

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[85] Each hospital has a set monthly expenditure threshold for each vote. The threshold is calculated according to the annual allocation. For example, if the annual allocation for drugs and medical supplies for a year is ZW$12 million, the monthly expenditure threshold is ZW$1 million. Any expenditure more of less than this figure will be either a saving or consumption of future resources.

wastage and referring back some patients to local clinics, and for home based care programmes.

The medical superintendent of the hospital had an interesting but contrasting view about costs: "I check hospital expenditure regularly and take corrective action. Doctors only become cost conscious when they are occupying the hot seat—like medical superintendent." Whilst two other doctors who were interviewed together said "We do not consider costs when deciding on patient treatment because its against my [our] ego and medical ethics. We do the [what is] best for the patient." Hospital cost containment is difficult to achieve under such circumstances.

The hospital had experience with a variant of functional budgets[86]. In the financial year 1997/98, HODs were given shadow budgets for direct expenditures and assumed responsibility for monitoring expenditure using departmental commitment registers. Monthly departmental expenditure per vote was guided by the hospital's monthly expenditure per vote threshold. In other words, aggregate monthly expenditures by departments were invariably not expected to exceed hospital monthly expenditure. According to the respondents, the system worked because HODs worked better, and competed in making savings. The idea was abandoned in 1998/99 FY because the hospital was allocated half of its previous year budget, and the HE considered the amount was too little to split across departments. The majority of managers acknowledged that the concept of devolved budgets was useful way in controlling costs.

Hospital autonomy: Respondents at this hospital did not support the idea of hospital autonomy. This view was driven by fears and perceived potential problems, namely; they did not know whether it would work or not because of lack of management capacity, lack of funds, and that there was room for improving the current system. The management team was conservative and apprehensive of change. The following are some of the comments made on introducing self-governance: "No, with this funding level, HSF is not adequate to sustain the hospital. In future it might work" [1], "No,

[86] These could be described as shadow departmental allocations because each hospital was just given an annual allocation figure with line items. HODs were supposed to keep a commitment register.

because of lack of capacity and administrative skills. Local authorities are not capable of running a hospital. Currently they are running bottle stores [beer outlets] at a loss. It will not work." [2], and "No. We need to improve on the current system, and not embark on these proposals." [3]. However, the theoretical benefits of such change were acknowledged (e.g. reduction of red tape) but the general feeling was that the hospital was not prepared for such a change. They felt that it was necessary to improve management capacity and ask patients to pay for services before autonomy could be introduced. They also suggested that the provincial offices should still retain some responsibility over the hospital so that the hospital can be assisted in times of crisis. It is clear from these responses that hospital autonomy was not a preferred option to the current system. This may be attributed to the financial crisis the hospital was facing. Resources were consequently seen as the main problem, not lack of autonomy. The negative views may also reflect fear of assuming absolute responsibility against a background of limited resources.

Contracting out of services: The majority of respondents (6/10) could not say whether or not the hospital contracted out some services. Contracting out of services was a new phenomenon to them. However, HE members mentioned that the hospital used to contract out laundry services to a private firm. The contract was cancelled when the hospital received a donation of laundry machines to establish its own laundry. According to the hospital administrator, the contract was expensive to run and the hospital used to run out of funds before the end of the financial year. The perception that own services were cheaper to produce shows how donated goods are generally treated in government facilities. Donated goods are usually not costed, and depreciation costs are excluded in the accounting system. This leads to a false sense of the actual costs.

10.3.3.5 Case Study 5: Hospital 5

Results of this case study are based on interviews held with seven hospital managers, three of which were members of the hospital executive (see Table A10.1). The author attended one executive meeting at this hospital.

Internal management structures: The hospital had all policy prescribed management organs: a hospital executive, procurement, finance, drugs and therapeutic committees and a hospital advisory board. All but one (the administrator) respondent were substantive in their management capacities. One out of seven respondents had some training in administration but the majority had considerable experience. The mean numbers of years spent by respondents working at the hospital in their positions was about 9 years (11 months to 29 years). The matron and the medical superintendent had spent 29 years and 14 years respectively working at this hospital. All management organs were operational.

What was unique about this hospital's management was that the HE co-opted HODs from laboratory, dental, physiotherapy and radiography services on a permanent basis. By widening membership to the executive committee, the hospital created opportunities for enhanced communication and participatory management. This inclusion flattened managerial hierarchy and improved horizontal communication. Another notable feature was that the medical superintendent was one of the longest serving doctors in the Ministry having started practising medicine in the late sixties. Unlike in other hospitals, he was keenly involved in the general management of the hospital and did minimal clinical work.

Internal Communication: The system of co-option of HODs into the HE enhanced communication and access to information. In-charge nurses said they used the matron as a conduit to the HE whilst other managers said that they used HOD meetings. Specialist consultants felt excluded from the management of the hospital: "We do not know what is happening outside the ward. As consultants we should be represented in some of these management meetings and committees." The exclusion of clinicians from management activities increased opportunities for internal conflict because clinicians lacked knowledge, for instance about available resources. One consultant even suggested that hospitals should retain fees something that had already been in operation for two years. This exemplified how severe the problem of communication between management and doctors/consultants was at the hospital.

Internal HE accountability: Non-executive respondents felt that the HE communicated most decisions to all departments either through interdepartmental meetings or in writing (circulated minutes or circulars) or through direct involvement. However, they admitted that, "Regular meetings are well enough." The weak link was between the HE and specialist consultants and general medical officers. Co-option of departmental heads not only increased communication but also accountability through participatory management.

Resource planning, use and accountability: Resource allocation was the role of the medical superintendent and the acting administrator. With the dismissal of the administrator in 1996/97 FY, the medical superintendent assumed that role. He felt he had to do the job himself because he felt "young people" had failed him by engaging in fraudulent activities. The medical superintendent devoted more time to administration and acknowledged doing clinical work only when it was extremely necessary. Like in other hospitals, the organisation of resource use was such that it was not possible to effectively trace resource use and ensure accountability. Resources were centrally controlled, and departments kept no input registers. Expenditure was monitored using monthly overall expenditure thresholds, which in many ways did not show resource wastage or its source.

Input procurement and distribution: The hospital used the traditional system of procuring inputs when using budgetary allocations—procurement through the GMS. It had a procurement committee, which in liaison with requesting departments was responsible for deciding how much and when to purchase, and from which supplier. In instances where large amounts of funds were involved, supplies were put to tender. The committee adjudicated tender submissions and sanctioned expenditure. Use of the HSF allowed for some flexibility in input procurement since there were no restrictions in the use of the funds. However, in this hospitals there was no evidence of any other approach to input procurement apart from the conventional one. Internal distribution of inputs was based on departmental requests through the pharmacy with no set guidelines. It was the responsibility of the departmental manager to keep stock of essential inputs and request more when necessary. Opportunities for input leakage through pilferage and wastage were abundant in the system because stock registers were used loosely.

Incentives and disincentives: Respondents were asked to describe their incentive environment and highlight what they perceived were key incentives. Responses included: CPE, transport allowance, car loans, free health services, departmental independence, and travel and subsistence allowances. Access to CPE was perceived as the major incentive. However, there was no evidence to suggest that staff CPE was related to individual performance. Of the four respondents who had CPE, three individually applied for it, and the provincial directorate nominated one. They all felt CPE was necessary for improving their work performance. It is important to notice that most of the highlighted incentives related to civil service conditions and not so much to the specific hospital-working environment. In addition, none of the respondents saw promotion as performance related because they all said it was based on training and experience, and individual initiatives (e.g. applying for jobs when vacancies arise). Those with better qualifications and experience were selected and interviewed for the posts. It is surprising though that some managers felt they had departmental independence in a context where resources were centrally controlled. Departmental independence was probably perceived in terms of day-to-day activities and not so much in terms of making strategic choices.

Managers' notions about perceived demotivating factors were biased towards monetary disadvantages. Their views are summarised as follows: low salary (40%), shortage of staff and other resources (20%), little appreciation and support from above (13%), lack of accommodation (7%), no call allowances for pharmacists (7%), use of unqualified nurses (ex-combatants) (7%), and lack of housing and educational allowances (7%). Apart from salary, respondents felt that: resource shortages, quality problems, and a system that did not appreciate and value individual efforts were the main demotivating factors. The last factor is particularly interesting in that it shows that individuals did not see the need to work harder because the system did not recognise them and award them accordingly. It could be argued that under such circumstance, simply addressing some of the perceived incentives without changing the way staff are valued might not necessarily motivate to work harder.

Staff coping strategies: High workload and low salaries were raised as major sources of discontent among hospital staff and the study sought to determine how staff coped with that. Three coping strategies for dealing with high workload were mentioned. First, giving staff off-days for extra-hours of work. Second, through indirect substitution of quantity for quality. In the pharmacy for instance, other activities were neglected to meet daily patient demands: "Sometimes we compromise stock management, [and] drugs expire on us. We need a full time person in the stock management room." Third, prioritisation of patients on the basis of urgency and whether or not their condition is life threatening—rationing services. One respondent said he coped with high workload "by sheer hard work and encouraging subordinates to be more committed to the job." The activities and strategies staff adopted at this hospital seem to suggest that they recognised the need to increase coverage but were prepared to achieve that coverage at the expense of quality.

There was general unwillingness amongst the respondents to disclose how they coped with low incomes. Only one respondent admitted to doing private practice when on leave. The hospital is located in the third largest city in the country with a thriving private medical sector. The hospitals also had the highest number of consultants, who seem to have *de facto* approval to do private practice wherever they are working. The three who responded said they had no alternatives, relied on spouse's salary and had to live within their means—"Focus on needs rather than wants", one said.

Staff tension: As mentioned earlier, the medical superintendent was actively involved in the day-to-day operations of the hospital as head and administrator of the hospital. That involvement together with his charisma, experience and respect created a sense of harmony at the hospital. Being a clinician himself, he seemed able to effectively bridge the gap between doctors/specialists and administrative staff. Clinical meetings with specialists and other doctors provided a platform for him to share information and consult with them. Such meetings, however, tended to be for discussing clinical cases and deaths.

Nevertheless, one senior consultant had this comment about operational relationships within the hospital; "Administrators always win in our context because they simply do not pay or purchase whatever you demand. However, it is mostly because funds are not available or the requested item might not be available at the GMS since administrators can no longer [are not allowed to] purchase from the private sector." The dominance of clinicians was somewhat checked by the relative power of the administrative group bolstered by active involvement of the medical superintendent in both administrative and clinical activities. The view that the administrator always won signifies acknowledgement by clinicians that the administrator wielded some power at least in resource allocation.

Quality of services: The majority view (5/7) was that the hospital was experiencing quality of services problems. Two respondents thought the quality of services was acceptable[87]. Quality problems were perceived as: shortage of staff (57%) and drugs[88] (14%), poor patient diet (14%), and use of unqualified nursing staff (14%). The problem of unqualified nursing staff was a unique problem at this hospital. Poorly qualified staff (ex-combatants with six months training) were employed by the hospital for political reasons. One nursing manager said: "There is a mixed grill in the nursing profession [at this hospital], that is nurses who were trained for six months only, eighteen months, three years, and those with post basic training." The hospital was perceived by many as having this structural problem.

These problems were attributed to inadequate human and financial resources (71%), and the "free-for-all" policy on public health services (29%). The argument was that the hospital budget was stretched because people had unlimited access to hospital services. Respondents felt that the problems remained unresolved because: (1) the government

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[87] This is what the respondents said, "It is fair. We used to be well stretched with drugs. Food is not so bad. I eat that food myself", and "Given available resources, the quality of care is good but there are problems related to availability of drugs. HIV/AIDS is a major threat because some patients are not responding to even the most expensive drugs."

was doing nothing about it, (2) financial resources were inadequate, (3) the problem was beyond the control of the hospital, and (4) fees could not be charged to everyone for political reasons. Asked how the problems could be resolved, a minority (3/7) felt they had no role in addressing problems related to staff and financial resources shortages. Other suggestions made were: that internal meetings be held to discuss drug use, increasing resource allocation to the hospital, retraining of nurses and decentralisation of budget and staff recruitment to the hospital level.

The responsibility of resolving quality problems was seen as a collective one by only one respondent. Others mentioned one of these cadres or groups: hospital executive, doctors, hospital administrator, medical superintendent and administrator, consultants and the provincial nursing officer. However, these suggestions were made within the context of what each respondent perceived as a problem and who was likely to resolve it. The perception that resolution of these quality problems was not a collective responsibility raises questions about perceived individual responsibilities and attitude towards quality of services. It is also indicative of lack of a collective vision on what ought to be done to address these problems. Inertia is likely to occur where there is no collective vision.

Hospital costs: All the respondents saw rising costs as a critical problem. Costs were perceived as a problem because of three factors. First, rapid increases in input prices in the light of limited funds (72%). Second, hospital fees were below cost recovery rates (14%). Third, cost escalation occurred due to avoidable expiry of drugs (14%). Unnecessary expiry of drugs was attributed to staff shortages in the pharmacy department, and the high workload, such that there was inadequate time for stock management.

As anticipated, the chief solution was that the government should increase funding for the hospital. Other solutions included training of doctors in management so that they

[88] There was a shortage of paracetamol at the time of the study.

can understand costs[89], allowing hospitals to charge everyone and making hospitals independent. Internally, respondents suggested that there be continuous communication between resource users on cost control, and use of the Essential Drug List of Zimbabwe. Increasing resource allocation appeared to be the popular soft option with less emphasis on what could be done with what was available. That perception is likely to fuel rather than curtail hospital cost escalation.

Asked to specify how as line managers they would address these problems within their own departments. A number of suggestions were made: ensuring effective use of resources through supervision, reducing wastage, justification of every diagnostic test, and maintenance of books of accounts. Respondents knew what could possibly be done to address quality problems but there was no evidence to show that they implemented these measures.

The idea of functional budgets was perceived as a feasible option in creating cost consciousness amongst hospital workers. One view was that "Functional budgets will make us to be cost effective, [through] buying [supplies] wisely and buying when prices are affordable rather than monthly competition of departments as is the case now." The existing arrangement was that departments competed to order supplies every month before the monthly hospital expenditure threshold per vote were realised. This created incentives for HODs to request as much as possible rather than procuring minimum requirements.

Views on hospital autonomy: The majority of respondents (6/7) said self-governance was a good idea and that it was opportune and necessary for improving hospital performance. Sceptics cited the example of an existing national referral hospital (Parirenyatwa) which was granted autonomy years ago but still experienced chronic problems because of lack of resources and political interference. Those pro-reform argued for reduction in bureaucracy and an increase in local responsibility for costs and

[89] This idea was confirmed by the views of one of the consultants who said, "I try as much as possible to prescribe alternative drugs. However, junior doctors do not seem to be aware of the cost. There is no forum (E.g. clinical meeting) where we can discuss these issues with junior doctors. Consultants are not

hospital revenue. As one respondent commented "If done well it will work, people need to be given real powers—in practical terms."

Autonomy was perceived as an option for supporting quicker decision-making, however, respondents raised concerns over self-governance, namely: (1) there would be no problems as long as adequate resources, and clear guidelines on how things should be done are provided; (2) potential abuse of power by those in management, for example corruption, victimisation, and nepotism, (3) lack of capacity may lead to mismanagement, and (3) procurement of foreign inputs would be grossly affected. These cautionary remarks represent need for pre-markers for policy success. Two pre-markers were suggested for such a reform, that is improvement in management capacity and instituting audit systems that dissuade people from engaging in perverse behaviour. The respondents also suggested that hospital autonomy should be linked to financing reforms that support cost recovery.

Views on contracting out of services: At the time of the study, the hospital contracted out laundry services, grounds work and had some ad hoc hospital refurbishment contracts. Only two members of the HE (medical superintendent and acting administrator) knew about the existence of these contracts, and the rest admitted ignorance and advised that the administrator was more knowledgeable. This was understandable given that line managers had no administrative links with the private providers except at operational level where services are delivered. Viewed from another dimension, this lack of knowledge amongst line managers is an example of communication breakdown within the system or limited scope of discussion content in HODs' meetings. If the level of participation and consultation on hospital-wide issues was high, it is likely that the knowledge level on contracting out both in theoretical and practical terms would have been high.

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even members of the Drugs and Therapeutic Committee. I feel that we should be represented in that committee.

10.3.3.6 Case Study 6: Hospital 6

Nine people were interviewed at this hospital of which two were executive members and seven heads of departments. The interviewees' profile is shown in Table A10.1. No meeting was attended and no records of previous meetings were reviewed at this hospital. This was because we had no permission from the head of the hospital who went on leave soon after we arrived.

Internal management structures: The hospital had two of the core management structures, that is, a hospital executive and a procurement committee. It did not have a finance committee, drugs and therapeutic committee and a hospital advisory board. According to the administrator the hospital had no HAB because it was difficult to get the right people as prescribed by national guidelines on formation of HABs. Most of the eligible people were not interested in becoming board members. The hospital is located in a small town and only a few people are eligible. Interviewees at this hospital had an average of 6 years working experience (from1 year to 12 years) at the hospital in their managerial posts. 50% of the interviewees had some management training.

Internal communication: Despite the existence of traditional channels of communication in the hospital, communication was perceived to be poor (6/9). The hospital executive was considered to be inconsistent in communicating information to other HODs and staff: "Sometimes they do not communicate, you have to be inquisitive and aggressive [to get it]". Some argued that HE meetings were not made public: " We are not told when there is a HE meeting so that we can communicate on issues to be discussed." Clinicians were strictly not involved in all management meetings; however, they had direct access to the head of the hospital. Nonetheless, they complained of non-involvement "We are not told anything because we are not involved in any meeting at the hospital." At the time of the study, no interdepartmental meeting had been held for the previous four months. Opportunities for HODs to participate in decision making at hospital level were limited.

Views on HE accountability: Executive members interviewed reported that they always tried to inform other workers through circulation of minutes, and discussing similar issues in interdepartmental meetings. Some of the HODs argued that not everything was communicated, and that excuses were given for bad decisions made: "This is the major problem in government, anybody in charge can afford to be complacent and not to do their work"[1], "No, in the past a lot of things happened which we did not know"[2], "They always make excuses whenever they make a wrong decision"[3]. What seemed to be happening in this hospital was that there was some communication and feedback between the executive but HODs felt some issues were not passed on. This could be interpreted as to mean lack of trust between "executive" managers and HODs. A review of hospital records showed that few such meetings were held in the previous year, and most such meetings were used to communicate new information (e.g. new policies and guidelines), and were characterised by "question and answer" sessions. This is not unusual in a bureaucratic context where accountability is perceived more as a vertical than a horizontal concept.

Resource planning and use: HODs were only involved in preparation of the hospital's budget proposals to the provincial directorate. Once budgets were approved and allocated, internal resource allocation was the exclusive role of the HE. This also applied to the use of extra-budgetary resources. It emerged clearly from the interviews that the process of resource use did not consider original departmental budgets. In other words, there was no relationship between what HODs asked for and what they actually got. In addition, original departmental proposals were not used to request for inputs. The hospital administrator saw the issue of resource allocation, use and accountability as an integral part of his job description. In practice, this meant that HODs could afford the luxury of using resources without having to account for them. It would seem such an arrangement made it difficult to guarantee that resources were used to maximum effect.

Input procurement and distribution: Two thirds of the respondents felt that the input procurement system was tortuous. They felt that it made it difficult for the hospital to adequately respond to patient needs. Most inputs had to be procured through the central government medical stores. Input procurement from the private sector had its problems.

According to members of the procurement committee, it was a requirement that private companies submit their curricula vitae, certificates of incorporation and latest audited accounts for them to become eligible for public tenders. The hospital is located in a small town where there are few potential suppliers, and most of them are small to medium size businesses without the expected track records. This made the process of tendering and adjudication slow and painstaking. Consequently input procurement could not always match demand and shortages were not uncommon.

Internal distribution of non-staff inputs was linked to resource use as mentioned earlier. Departmental inputs were ordered through the pharmacy, and it is in this department and administration that distribution decisions were made. The pharmacy managed the medical and surgical vote, which constituted about 60% of total non-salary recurrent expenditure (1997/8 FY). The administrator approved all input requests before these were sent to suppliers, and this afforded him the opportunity to monitor expenditure patterns.

Incentives and disincentives: Responses obtained on staff incentives can be categorised as follows: access to CPE (35%), availability of subsidised accommodation (29%), free health services (18%), transport allowance (12%) and job satisfaction (6%). The main incentive for many was opportunities for further continuous professional education. This was followed by subsidised accommodation in which staff paid 5% of their gross salaries as rent, which was well below the market rent. Two executive members said they either got CPE through nomination by the provincial directorate or individual initiatives. Most HODs obtained CPE though nomination by the HE (4/7), professional associations (2/7) and individual initiatives (1/7). There was no evidence of a relationship between access to CPE and performance since none of the respondents saw the nominations as linked to individual performance. The same was true for subsidised accommodation and other reported incentives.

Low salary was the major complaint (44%) followed by shortages of staff and material resources (22%). Respondents felt that they worked under stressful conditions because of inadequate staff, and shortages of essential inputs compounded the problem. A minority raised the problem of accommodation (6%), unavailability of housing and educational loans (6%), lack of recreational facilities (6%) and CPE (6%), and rigid career structures for some staff categories (6%). For instance, a pharmaceutical technician cannot be promoted beyond a senior pharmaceutical technician to a pharmacist. It is a dead end post.

Staff coping strategies: Asked how they coped with high workload, nursing managers said they used student nurses and/or auxiliary nurses in the wards. Departmental heads for radiography and physiotherapy felt their workload was manageable compared to central hospitals. The rest of the respondents reported that they worked hard: "We do our best under the circumstances", " I work extra-hours", and "We run around until our feet are sore." Use of unqualified staff in cases of high workload appears to be a more plausible strategy unlike the expected responses that staff worked extra time even though they complained of low salaries.

Respondents were quick to point out that their salaries were low relative to the workload (also when compared to the private sector). Asked how they coped with such low salaries: A third (33%) said they did nothing because there was no alternative, 22% said they did private practice, 22% said they either did cross-border trading or farming, 11% relied on bank loans and 11% did not respond. It is most probable that there could be other informal activities that staff employed which were not highlighted because of the sensitive nature of the discussion.

Staff tension: None of the respondents saw any problems in the way different staff categories interacted in the hospital. Conflicts within the hospital were perceived as reflective of lack of communication. One respondent felt that potential problems between the administrative group and clinicians could be avoided if "clinicians are educated on funding and costs of hospitals." The administrator felt he was in control of resources in as far as expenditure was concerned. Although there was this general understanding, the way hospital management was structured did not promote active involvement of clinicians. This made the role of the medical superintendent and communication much more important in avoiding staff tension and conflict.

Quality of services: All respondents conceded that the quality of services at the hospital was below par. Various quality problems were reported: overcrowding in wards (24%), poor patient diet (18%), poor environmental hygiene (18%), staff shortages (11%), poor patient-staff relationship (11%), shortages of drugs (6%) and equipment (6%), and poor specimen collection (6%). The most cited problem was limited space especially in the wards where patients were crowded. Patient diet was viewed as poor because patients were said to be complaining about it. Environmental hygiene (ward cleanliness) was perceived to be poor and this was related to crowding in the wards. The severity of the problem could be sensed from what some of the respondents said: "I would not want to be admitted here because, for example the male ward is congested and cleanliness is poor."

They argued that high workload and staff shortages compromised patient-staff contact time as staff aimed to finish rounds or queues rather than give maximum care. One respondent summarised quality problems at the hospital by saying: "Nursing care here is good compared to other places I have been because nurses here are committed, but the wards are dirty and old, the hospital is dilapidated. Lack of investigative capacity sometimes affects our medical care because we end up treating patients not knowing exactly the disease—we use clinical presentations." In sum, the hospital experienced quality problems from both structural and process perspectives.

These problems were attributed to several causes; lack of staff and financial resources (50%), high workload (17%), inadequate hospital physical capacity to meet demand (17%), lack of supervision (8%), and low staff morale (8%). Four main reasons were given why quality problems persisted: (1) inadequate funding, (2) difficulties associated with changing people's attitudes, (3) inability of the hospital to attract staff because of its rural setting with minimal schooling and recreational facilities, and (4) that end users were not consulted about their problems in health services planning. The consensual view was that it is the responsibility of HODs to address those problems amenable to local solutions because there are strategically located to do so.

Views on hospital costs: There was general unanimity amongst respondents that costs were a big problem facing the hospital. Rising costs were attributed to increasing input prices. The hospital regularly procured inputs from the private sector at higher prices because the GMS could no longer cope with timely hospital requirements. They saw continued use of expensive approaches to patient management, wastage and pilferage as contributing to cost escalation. Input shortages were regular, as available resources became inadequate. Three main explanations were given why the problem remained unresolved. First, staff was unconcerned about costs and unknowledgeable. Second, clinicians were difficult to control. Third, HODs had no specific budgets to manage. Clearly, these elements are ingredients for cost escalation. The first explanation is particularly interesting given one of the respondent's perception of the issue;

> "I consider patient costs mostly in making my clinical decisions. For example, I check whether or not the patient can afford an x-ray or particular drugs before prescribing. Hospital costs, yes, if there are alternative drugs I prescribe the least cost. However, we are not informed about how much the hospital gets, or anything to do with costs. So I do not know much. All I know is that there is no money."

This clearly shows how exclusion of clinicians may have a significant impact on hospital costs. Solutions suggested for cost containment included communication with resource users, ensuring use of EDLIZ and sustained education of staff (particularly doctors) on cost control. Respondents felt it was the principal responsibility of the HE and the administrator to control costs. The concept of functional budgets was generally perceived as an option for cost control as evidenced by such comments: "It makes us cost conscious but sometimes we cannot meet patient needs because of the [monthly hospital expenditure] limit of ZW$315 000 (US$8,289)." Prices [of inputs] are just high, we cannot buy much" [Pharmacy] and, "Each year should begin with each department knowing its budget." This suggests that knowledge about resource availability was considered important in provider behaviour.

At the time of the study the hospital administrator had held several meetings with HODs, sisters-in-charge, doctors and even general hands on cost control. He had also started a process of establishing departmental budgets by asking line managers to start using commitment registers: "I have asked departments to have commitment registers as a necessary step to understanding cost centres. This information can be used to develop unit and purchase plans." This is an example of a local initiative to address the problem of resource use and accountability. Internal adaptive mechanisms seemed to be at play in this case study rather than expectation of government support.

Views on hospital autonomy: The need to change hospital governance was commonly accepted by all but two respondents who feared potential problems due to lack of management capacity and funds[90]. Those pro-reform respondents expressed strong views that change was needed to reduce bureaucracy and its related problems, and allow the hospital to focus on essential and priority issues. Nonetheless, hospital autonomy was not perceived as problem-free and the following caveats were raised: (1) potential shortages of finance as most people do not pay for services (sustainability problem), (2) abuse of power by management (corruption), and (3) mismanagement due to lack of capacity. It would seem that some of the fears raised were a result of respondents' misunderstanding about what hospital autonomy entailed in practice. It seems autonomy was viewed as a total shift from central government to local government. Nonetheless, the responses show that it was generally understood and accepted that the hospital had management capacity problems.

In order to avoid these potential problems in training of hospital managers, changing the user fee policy so that people pay, and reviewing the history of autonomy in the country were suggested as preventative strategies. In general, the principles of hospital autonomy were acceptable to most respondents provided policy makers adequately considered these potential problems.

Views on contracting out of services: The hospital had an old contractual arrangement for laundry services with a private provider because it never had its own laundry facilities. It also contracted out hospital grounds maintenance and mortuary services. The small hospital mortuary could not cope with the upsurge in the number of deaths at the hospital in the last two years.

HODs had little knowledge about contracting out of services. This knowledge was restricted to the administrator and other HE members. This was particularly interesting considering that the hospital had a long history of contracting out laundry services. The few respondents that attempted to answer some of the questions believed that contracting out laundry and mortuary services was costly. For instance, at the time of the study the cost of keeping a corpse at a private mortuary was ZW$37 (US$1) for a mean duration of stay of two days. The majority felt it was cheaper in the long run for the hospital to have its own services. Contracting out is a new concept in the health sector especially in the periphery, and it was not surprising that some respondents were ignorant about it. Respondents felt strongly that the traditional way of organising services was the best option.

10.5 Comparative analysis and summary

Clearly, the study hospitals were subject to both system-wide and hospital specific constraints. However, as hospitals at the same level of care, they were exposed to a fairly similar external context. They all had limited decision-making space in strategic and some operational areas. That *per se* is not a novel finding because it is characteristic of most bureaucratic systems. The basic question of the study was why similar hospitals operating within the same bureaucracy performed differently. Logically those differences are explored by examining what happens inside the hospitals. Tables 10.2 and A10.3 provide comparative summaries of the main features and characterisation of the internal organisation of the six hospitals.

Internal management structure

Three hospitals (1, 3 and 6) did not have HABs because of either lack of eligible people or interest among the eligible. That means that there were no explicit structures for community involvement or consultation. In two of the hospitals (2 and 4) we witness HABs actively participating in decisions concerning utilisation of fee revenue and

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[90] Quotes from two respondents: "If they make hospitals autonomous, I will leave because where will these boards get the funds. Unless it is some rich company taking over then I will stay", "We are not yet ready. Rural district councils do not appreciate [understand] how we function."

mobilising community support. The boards had considerable autonomy in deciding on what to spend hospital income on as long as it was not related to staff benefits but patient welfare. Although they all fell under public governance there were noticeable disparities in capacities to generate revenue and resolve local problems between those that had a HAB and those that did not. This was reflected in the type of suggested solutions given to hospital problems and who was responsible for addressing them. Those without boards or active boards (1,3, 5 and 6) tended to "blame" government for providing limited support. In a sense, hospital boards signified a slight departure from bureaucratic governance and staff interviews showed that these structures allowed for some flexibility in decision-making. There was no evidence to suggest differences in performance across hospitals due to the presence or absence of a HAB. This may be attributable to the fact that the boards had no "corporate" functions, for instance setting the mission and strategic direction, as under proposed new autonomous arrangements.

Not all hospitals had policy prescribed management structures. Hospitals 2, 4 and 5 had all management organs whilst hospitals 1, 3 and 6 only had the core structures: that is a hospital executive and a procurement committee. The absence of some management organs suggests that formal co-ordination and communication between medical and non-medical departments, and clinicians was somewhat limited. For instance, the absence of a drugs-and-therapeutic committee meant that formal interaction among clinicians, executive members and heads of medical and non-medical departments on clinical practice was absent. It appears that clinical practice was left entirely to individual clinicians without any input from the committee or other HODs. Such structural weaknesses were a source of tension as evidenced in Hospital 3 where clinicians admitted ignorance about management activities but showed interest in involvement. Ideally the internal structure must permit effective co-ordination and formal communication (Buchanan 1977), and that seemed not the case in the three hospitals.

Skills mix and experience tells us something about relative differences in management capacity. All the hospitals had substantive executive members except Hospital 1 where all but the pharmacist were in an acting capacity. There were similarities in the skill mix of hospital executives in terms of basic technical training because membership of the executive is prescribed by policy. However, management skills and experience were diverse (Table A10.2). At hospitals 1, 2 and 6 at least 50% of management staff had some form of management training (ranging from basic to graduate level), and Hospital 5 staff had the highest average management experience of 9 years. Medical superintendents were appointed on the basis of clinical experience rather than management training and/or experience and it was therefore not surprising that in three case study hospitals (1, 3 and 4) the acting medical superintendents were reported to have been demoted for managerial incompetence. This could be explained by four factors: (1) lack of management or public health training for medical graduates, (2) weaknesses in the recruitment criteria which emphasises clinical capacity and/or experience at the expense of management capacity and/or experience, (3) lack of appropriate on-job training and support for managers, and (4) the general perception among clinicians that administration was an unnecessary burden given the similarity in salary and perks between general doctors and medical superintendents. In addition, shortages of doctors meant that junior doctors were promoted to hospital management posts before they acquired the relevant experience.

Unlike the rest of the hospitals, hospitals 1 and 3 had more ad hoc than formal meetings. This might be attributed to the dominance of the administrators who in many cases were responsible for organising meetings. For hospital 1, this might also be explained by the perceived autocracy of the demoted medical superintendent. From a bureaucratic perspective, the operationalization of internal structures in hospitals 3 and 1 were disorganised and not in accordance with hospital policy.

Table 10.2 Hospital Classification by major organisational factors

Hospital	1	2	3	4	5	6
Management structures[91]						
Management capacity[92]						
Managerial participation[93]						
Formal communication[94]						

Key: Colour intensity reflects degree of realisation: High intensity = high score, Medium intensity = medium score and low intensity = low score.

Despite intrinsic similarities in management structures across the hospitals, management practices varied notably. Table 10.2 shows a summary view of the similarities and dissimilarities. Interviews showed that Hospital 1 and 3 were perceived to be non-participatory either because requisite internal meetings were not convened as expected (e.g. HOD meetings) or there was apparent lack of involvement of HODs and doctors in making hospital-wide decisions. It might be that informal communication was more acceptable since meetings were mostly ad hoc and only a few interviewees expressed interest in being involved in making hospital-wide decisions. Hospital 5 had a much more structured participatory management style compared to the others since some HODs were considered as part of executive management. That formalised their involvement in management, and in a sense reduced operational hierarchy. In hospitals 2 and 4 participation by HODs in making hospital-wide decisions was by co-option and depended on discussion subjects. If hospital discussions on specific subjects required technical input, the respective HOD was co-opted into the discussion. Participation in hospital 6 appeared to be a product of administrative exhortation. It is argued that such type of participation is ineffective (Handy 1993).

It is surprising that hospitals 2 and 6 provided a contrasting view of limited internal communication against a background of what was relatively considered as participatory

[91] Refers to the expected number of functional policy prescribed structures: Low = non-functional structures, medium = at least core structures (that is, executive and procurement committee) functional, high = all expected structures functional.

[92] Refers to skills mix and experience: low = none with management training and /or relevant experience (<5 yrs), medium = at least half with management training and/or ≥ 5 years experience, high = all with management and/or experience (> 5 yrs). See also Table A10.2

[93] Refers to level of involvement of HODs in hospital-wide decision-making: low = none involvement, medium = systems of co-option practised, high = formalised system of involvement.

management. One would have expected limited communication to be a major concern in those hospitals where non-participatory management practices were perceived to exist (as in Hospitals 1 and 3). The existence of limited communication and managerial participation suggests that relevant information was not shared thereby increasing decision-making uncertainty (Cole 1995). Accordingly, individual efforts tend to be diffused thus increasing potential for wastage. Differences in the actual loci of managerial control of hospital activities were particularly interesting. In principle, the hospital executive should be the centre of control of activities as found in hospitals 2, 4, and 5. In practice, administrators wielded considerable influence and power in hospitals 3 and 6 partly because they controlled the hospital budget and a large group of non-medical staff, and partly because the respective executives were relatively weak. However, the administrator's influence did not extend to doctors' clinical activities. It was only in hospital 2, 4 and 5 that executive managers and HODs of medical departments demonstrated relatively better capacity to engage doctors and consultants in discussing hospital-wide issues.

By design all the hospitals had to a limited extent, structures for internal managerial accountability. HODs were accountable to the medical superintendent who was the chairperson of the hospital executive. Clinicians reported directly to the medical superintendent and were not answerable to medical and non-medical heads of departments or wards. The interviews showed that in hospitals 4 and 5, management executives were perceived as fairly accountable because formal meetings were held as expected, management was participatory, communication was good and the respective hospital executives were in control of activities. Hospital 3 had the opposite situation, and in addition, the administrator was relatively powerful. There were mixed views on executive accountability for hospital 2 with some respondents alluding to the difficulties of assessing it in a bureaucratic system, and others suggesting that the problem was much more related to lack of communication between the executive and other staff. For instance, lack of feedback meetings and the weak link between management and

[94] Refers to both formal lateral and vertical communication: low = no formal meetings (scheduled and with rules) of any type, medium = regular formal meetings of some types of expected meetings, high = regular meetings of all expected meetings.

doctors. There was no evidence of executive accountability in hospital 1 because the hospital functioned without any formal executive management activities.

A key feature of hospital internal organisation explored was mechanisms for resource use and accountability. The perception that the administrator was "the controller" of resource use and therefore the accountable-officer was a common finding across the hospitals. This might be explained by the fact that hospitals were not organised into clinical directorates or departments with devolved budgets. Centrally controlled budgets created a situation where the actual resource users had no explicit obligation to account for resources used. Hospitals responded to these organisational problems in different ways. Hospital 4 experimented with the concept of devolved "shadow" budgets, and that experiment was viewed as a success. The experiment had three advantages. First, it entrusted HODs with responsibility for using and accounting for use of resources. Second, that responsibility engendered cost saving activities such as use of stock control cards and general parsimonious use of essential inputs. Third, it made the job of the administrator of controlling global costs much more feasible. Although the experiment did not include overhead costs and retention of departmental savings, it demonstrated the potential benefits of using devolved budgets.

In Hospital 6, the administrator took the initiative to inform and consult widely about hospital resource constraints and how to optimise use of available resources especially with those who use or make resource use decisions. The executive at Hospital 1 had a particularly novel way of dealing with the issue—through the Efficiency committee. No such structure existed in public hospitals at the time of the study. This committee was more proactive in that it physically checked whether or not resources were used efficiently on a regular basis and educated staff on "efficient" practices. The incentives and sanctions generated by such a committee had the potential of creating cost consciousness among workers but not as much as devolved budgets.

Inextricably related to the above discussion is the extent to which HODs were involved in hospital resource planning. This has implications for staff knowledge and attitudes towards resource use practices. It is not surprising that managers and doctors were not involved in resource planning in hospitals 1 and 3 given the type of management style observed there. In the other hospitals, HODs were at least involved in the preparation of hospital budget proposals. However, their role ended with the preparation of budget proposals and anything after that was the prerogative of the hospital executive. This is another organisational feature that was common across the hospitals.

Incentives and functional impact

Financing hospitals through annual budgets without any link to performance is likely to have adverse effects on performance. With such systems resources tend to be guaranteed and that provides no incentives for staff and management to contain costs. This was a common feature across the study hospitals. The internal structure of budget control and use in all the hospitals created a situation where users of resources were not accountable for their activities. Budgets were centralised and hospital administrators had the formidable task of controlling costs with unsupportive structures. The link between clinical activities and cost control were weak. Experiments in hospitals 4 and 6 signify attempts to strengthen this relationship.

At individual level, it was clear that monetary incentives were considered to be important by the respondents. However, the nature of the reward system was such that good performance was not rewarded and neither was poor performance penalised. Reported incentives were generally accessible to many without any observable link to individual performance. This meant that the incentive structure was incapable of improving performance but rather may have increased staff retention. Furthermore, the non-discriminatory nature of the remuneration system meant that non-monetary incentives were particularly important in explaining observed differences in staff behaviour across the hospitals.

Staff perceptions on quality and costs of services

There is likely to be an inherent relationship between staff attitudes towards cost and quality and the prevailing incentive regime. Respondents in all the hospitals admitted that they were experiencing quality problems. Reported problems were generally structural in nature (e.g., resources shortages) and similar across the hospitals. Noticeable perception differences were observed for costs at organisation, and less so at individual level. As discussed earlier, some hospitals made deliberate attempts to contain costs and increase efficiency of service delivery. Interviews showed that it is in those hospitals that respondents tended to proffer local solutions and generally felt they had a role to play as HODs in addressing the problems.

The broad consensus view on quality and costs was that these problems were beyond hospital management control. Whilst this might have been the case, to some extent it manifests two things: Firstly, that the problems were not locally owned but rather viewed as government's problems, and secondly, that hospital staff had no shared vision and goals on costs and quality expectations—the problem of goal clarity as defined in expectancy theory (Wright, 1991). This attitude might be related to accountability mechanisms and the absence of incentives created by non-performance related rewards. Existing internal structure could not allow for identification of sources of avoidable poor quality of services and resource wastage.

Perceptions of proposed hospital reforms

Organisation reforms change the incentive structure both within and outside the organisation. The concepts of hospital boards, and autonomy in general were perceived as necessary provided specific safeguards were established. These perceptions show that hospital managers were aware of the organisational constraints related to bureaucratic governance and decision-making. It was particularly interesting that respondents, despite their limited knowledge of contracting, expressed concern about the cost and quality of contracted services. Contracts were generally perceived as costly even though costs of own production were unknown among the respondents. The problem of quality and costs of services was mentioned in all the hospitals that had at least a contracted service. The common argument raised by respondents was that it was not possible for them to control the quality of contracted services even though it affected the quality of their own activities (e.g. infection control in laundry services). This loss of control of service quality and costs was perceived as disadvantageous to the hospitals.

Using the two tracer reform policies it was possible to expose core hospital management capacity problems, the likely signals these reforms would provide and how differently hospitals were likely to respond. For instance, management at hospital 4 was more conservative arguing that more could be achieved by strengthening the existing system. Most respondents feared that the majority of hospitals lacked management capacity to become autonomous, and to effectively manage service contracts. Capacity building was therefore viewed as a necessary prerequisite for hospital reforms to succeed.

CHAPTER 11 OVERALL DISCUSSION OF METHODS AND FINDINGS

11.0 Introduction

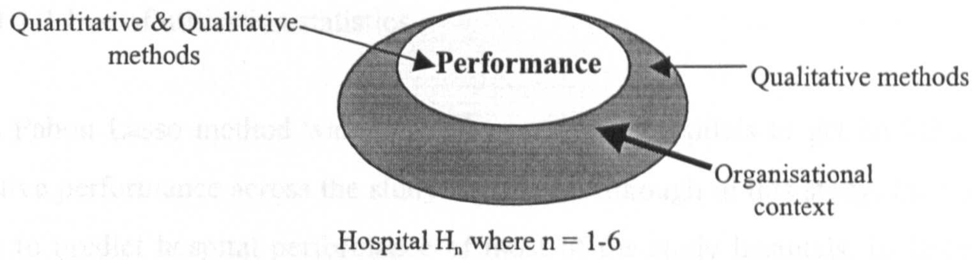
This chapter is organised into two broad sections. The first section starts with a discussion of the approach to the study and its implications for generalisability of results. It then discusses specific methods used for measuring hospital performance including qualitative analysis. Section two is a discussion of findings. It begins by discussing use of activity statistics in performance assessments. This is followed by a discussion of relative costs and efficiency, quality of hospital services, and cost-quality tradeoffs. The chapter ends with a discussion of the relationship between performance and internal organisation.

11.1 Discussion of methods

11.1.0 General methodological approach and generalisability of results

The general methodological approach of the study was a multiple case study design with both quantitative and qualitative methods designed to meet the differences in logic of inquiry of the study objectives. The study sought to do three things. First, measure hospital performance. Second, describe and analyse internal organisation and management. Third, analyse the relationship between performance and internal organisation and management. The first objective (performance measurement) was addressed quantitatively (step-down and micro-costing, assessment of structure and process quality) and qualitatively (interviews and non-participant observation). The second and third objectives were addressed qualitatively because of the multitude and non-tangible nature of some of the variables.

Figure 11 General Methodological Approach to the study



Some studies have made attempts to quantitatively measure the influence of organisational factors on hospital performance (Scott et al 1979, Sloan and Becker 1981, Al-Haider and Wan 1991, Rivers and Bae 2000) but as highlighted above it is not possible to include all relevant variables. This study did not attempt to measure causal relationships between performance parameters and its determinants but it sought to describe and analyse in detail the organisational context within which specific performance levels were achieved. Through this process organisational determinants of hospital performance were explored. This approach was preferred to the statistical approach because rather than aiming to accurately measure performance and failing to adequately explain relative performance, it was considered better to take a two pronged approach that not only measured performance accurately but also allowed for a better understanding of its institutional context. Performance levels were then related to institutional characteristics.

Since this was a multiple case study of six out of seven tertiary hospitals the results are a reflection of the national situation at that level of the hospital system. Some of the findings can be assumed similar to those expected in central and secondary hospitals because they operate within the same bureaucratic environment. However, it is also important to realise that the institutional focus of the study (case study) meant that some of the findings would be peculiar to tertiary hospitals and to specific institutions, and hence cannot be generalised. Some hospitals introduced innovative approaches to doing things, which were perceived to have improved their performance compared to their own previous performance, but may not have resulted in better performance than other hospitals.

11.1.1 Measurement of hospital performance

11.1.1.1 Use of utilisation statistics

The Pabon Lasso method was useful for screening hospitals to get an initial sense of relative performance across the study hospitals. Although in this study, the method was able to predict hospital performance of most of the study hospitals, in larger samples including diverse types of hospitals that might not be the case. Unlike the study hospitals, hospitals at different levels of the hospital system are likely to have markedly different demand (utilisation levels) and disease profiles (e.g. acute and chronic cases). Nonetheless, it may still be argued that if resources are scarce for using other methods of assessing hospital performance, this method alone is insightful. It helps raise relevant questions about the performance of hospitals. For instance, why hospitals have high or low bed turnover rates compared to the average especially when similar categories of hospitals were grouped. The specificity and sensitivity of the method is amenable to manipulation (altering the confidence intervals) which makes it accessible to hospital managers and policy makers. Data demands for this method are also manageable in LMICs where information technology is still developing.

11.1.1.2 Relative costs and efficiency

Only inpatient services were considered in the measurement of relative costs and efficiency in this study. Within inpatient services specific wards (medical, surgical and maternity wards) were chosen for the analysis. These wards constituted more than 80% of inpatient workload. Those excluded were outpatients/casualty departments, eye and psychiatric wards, MCH/FP units, dental units and others. All these departments were considered in the actual costing (apportionment of costs) but were not used for comparison purposes. If economies of scope existed between inpatient services and other excluded services, they were captured in the costing exercise and are reflected in the unit costs. Because of the nature of the costing methods and available data used, economies of scope or scale were not explored. Data aggregation was the major constraint. That means that the observed cost estimates were not insightful in identifying hospitals that might have had high (or low) average costs but low (or high) marginal costs. Cost accounting methods assume a straight-line cost function in which average cost equals marginal cost. Information on marginal and average costs is useful in determining economic efficiency and making policy recommendations regarding the contraction or expansion of services (Hansen and Zwanziger 1996, Kumaranayake 1996). The study, however, did not seek to explore issues of optimal hospital size. The study hospitals had similar bed numbers and service mix (e.g. inpatient and outpatient services), and therefore exploring whether economies of scope existed or not was unlikely to yield additional information relevant to comparing performance across them. The situation could have been different if service mix or scale was substantially different between the hospitals.

Measurement of hospital efficiency is not a straightforward process because it does not comply with the engineering perspective of input–output relationships—many other factors come into play (McGuire 1989). Therefore, the interpretation of the results of such attempts must take cognisance of a variety of contributory factors including organisational factors and case mix. Case mix is a particularly important factor in influencing unit costs (Chawla and Govindaraj 1996, Söderlund et al., 1997, Tatchell 1983). Barnum and Kutzin (1993) and Bitran (1995) argue that for there to be credible comparison of hospital efficiency (or performance generally) between hospitals three conditions must be met: that there be correction for case-mix, case-severity, and an adjustment for quality of services. The study employed a facilities and service mix approach to standardising output. This approach was appropriate given the similar roles the hospitals had and the general lack of quality data to use for adjusting for case mix. In addition, tracer diseases were used to calculate costs per case as a way of adjusting for case mix and severity differences. The results of tracer costing dovetailed with those of hospital level costing implying that the use of facility and service mix was adequate in addressing differences in case mix and severity. Ideally, case mix and case severity adjusters are constructed to ensure comparability of hospitals. Intermediate outputs (patient days and admissions) were used in the analysis. Therefore the findings show the relationship between hospital costs and levels of output (Tatchell 1983) from which insights about relative efficiency of hospitals were drawn.

Application of bottom-up costing methods in tandem with top-down costing (e.g. for staff costs) yielded high quality estimates by minimising the limitations of each method. In most studies, hospital costs for specific diseases have been calculated based on retrospective data (De Jonghe et al., 1994, Saunderson 1995, Sanders et al., 1998, Kirigia et al., 1998, Migliori et al., 1999, Sanyika et al., 1999). Very few prospective institutional disease-costing studies have been carried out (Babson 1972, Eisenberg et al., 1984). Data used were patient-specific and therefore produced better estimates of actual costs than top-down costing methods. This is because costs associated with inefficiencies (e.g. expired drugs) were eliminated.

Use of tracer costs has its limitations. Kessner et al (1972) argue that tracers must be used in sets that can fully reflect patient and hospital characteristics (representative). The use of three tracer diseases did not meet that criterion. For example, no surgical case was considered so that a review of theatre and surgical recovery activities could be made. Nonetheless, the selected conditions were among the top five causes of hospital admission and deaths in public tertiary hospitals (See Chapter 4). Tracer data were not uniformly available across the hospitals. For instance, malaria data were not available for Hospital 6 because fieldwork activities at the hospital were carried out outside of the malaria season. Inconsistencies and incompleteness adulterated tuberculosis data for hospital 5, and those for hospital 3 were incompatible with the rest because of the non-admission (referral) policy for confirmed TB cases. These information gaps affected the completeness of data across the six hospitals and the ability to achieve unambiguous rankings.

Use of time and motion surveys for calculating staff costs could have improved the accuracy of the costing approach but was impossible within the resources available to the study.

11.1.1.3 Measurement of quality of services

Quality measurement, as highlighted throughout this thesis presents difficulties. Outcome measures of quality are preferred but are the most difficult to measure and attribute. The study measured quality using the structure-process approach at two levels:

hospital and patient level. At hospital level, structural inputs were assessed in order to establish and compare the potential of hospitals to provide quality services. This approach has intrinsic weaknesses in that the relationship between structure, and process/outcome is unclear. It seems valid though, to assess structure in contexts where structural constraints are prominent in the delivery of hospital services. It would seem inappropriate to assess processes when the means to support the processes are not available. Data on availability of drugs at hospitals 1 and 3 could not be obtained and that might have affected the comparative analysis. Furthermore, aggregation of structural quality for comparative purposes might have hidden differences in specific departments or wards across the hospitals.

At patient level both structure and process dimensions of quality were assessed using the same cohort of tracer patients. The use of explicit quality criteria for prospectively recruited patients, enhanced the validity and reliability of the results. Uniformity in the assessments was relatively high but as expected, use of explicit criteria meant that any deviations from the expected, even though clinically justified in some cases, might have been rated negatively. Differences in quality rating between the "health accountants" were not assessed in the analysis on the assumption that the quality criteria were explicit enough to minimise any potential differences. Differences might have occurred in practice. The results were highly dependent on the weighting system used and it might be that another system of criteria setting might have yielded different results. Use of a panel of local experts in the development of the criteria authenticated the process. As aforementioned, use of only three tracers might have biased the results. A representative sample of tracer conditions might have given different results. Overall however, although the study did not use outcome measures of quality, it was able to assess the appropriateness of what was done to and for the patient.

11.1.1.4 Measurement of cost-quality tradeoffs

Difficulties were encountered in the application of the cost-quality trade-off conceptual framework discussed in Chapter 9 especially the construction of a best practice curve (cost-quality curve) for each tracer condition under the assumption of efficient delivery of services. This was because whilst the panel of experts were able to establish the expected quality and associated resource consumption level for each tracer, it was not possible to establish a series of such combinations that would trace out the best practice curve. This is explained by the uncertainty surrounding the effectiveness of medical interventions (Bunker 1988) and therefore difficulties in predicting positive outcome. Instead of defining the best practice curve, scatter plots with defined expected cost and quality reference lines were used to assess the relative performance of the six hospitals. Use of the reference lines shed light on both technical and allocative efficiency. However, the results generated by this model could be improved by further identification of points on the "best practice curve".

11.1.2 Qualitative analysis of organisational factors

The main advantage of using qualitative methods in analysing organisational factors and performance was that it was possible to look at several factors, which other methods (for example statistical methods) cannot readily accommodate. The majority of these factors are not tangible and measurable in quantitative terms (for example attitudes, behaviour, and power) for statistical modelling. It would seem that no amount of statistical modelling could adequately capture the idiosyncrasies of different hospital organisations. The underlying assumption of the study was that it is through looking beyond the technical relationships that we can understand why systems work or do not work. Aiken et al (1997) propose a similar argument that organisational attributes obtained through secondary sources do not reflect how those attributes are perceived by and affect the behaviour of practitioners in the organisation. For instance, a good cost control system might not work in practice due to low staff compliance. This might occur if cost control is not perceived to be important or if responsibility for costs is unclear. The limitation of this approach was that causation could not be established definitively but inferred through characterisation of internal structure. Related to the foregoing was the problem of "aggregation" of the various internal organisational variables. The most feasible and practical approach was to focus on those features of the organisation (based on organisational theory and evidence) with the greatest potential to influence performance.

11.3 Discussion of findings

11.3.1 Relative hospital performance using activity statistics

According to the Pabon Lasso method, fifty percent of the hospitals were "outliers" (Hospitals 1, 2 and 6), and another fifty percent (Hospitals 3, 4 and 5) conformed to expected performance (were located within the expected performance zone) (see Figure 5). The outliers were outliers in the sense that they either performed above average or below average. However, hospitals 3 and 4 were located in sector 1 and hospital 5 in sector 3, which suggests that some differences still existed amongst the hospitals. None of the hospitals was located in sector 4 (high BOR and low BTR). Hospital 6 demonstrated poor performance because of its high bed occupancy rate (82%) and low bed turnover rate (43%) which might have been influenced by relatively high bed availability (2.6 beds per 10,000 people) at comparable demand (utilisation) levels (11 admissions per 1,000). It was clear at this stage of the study, that Hospital 6 exhibited characteristics of a poorly performing hospital. Hospital 1 provides an opposite scenario to hospital 6 in that it had relatively high performance indicators: high turnover rate (83%), bed occupancy rate (97%), and high utilisation levels (17 admissions per 1000 per year). Although Hospital 2 was classified as an outlier, it was a borderline case in sector 2 characterised by high BTR and low BOR. There are several possible explanations of such performance differences across the hospitals and chief among them was likely to be professional and management practices.

The next stage of the study was to explain the hospital positions in the Pabon Lasso framework. Similar positions were observed when medical wards were placed in the same framework except that Hospital 2 and Hospital 3 swapped location in sectors 1 and 2 (see Figure 5.1). Variation in hospital service statistics is a function of many factors: demand and/or supply, hospital size, management and clinical practice, morbidity patterns, and randomness (McPherson 1988, Rhodes et al 1997). Conclusions about performance could not be made based on these results alone without exploring some of these key factors as the succeeding discussions attempt to do. Two important things were learnt at this stage of the study. First, that the hospitals had variable performance levels. Second that although the six study hospitals were all tertiary hospitals, they had some distinctiveness, and it would be improper to treat them as homogenous in their performance evaluation. Each one of them warranted a thorough analysis of possible internal and external determinants of observed performance.

11.3.2 Relative costs and efficiency of hospital services

a) Hospital and ward level.

The distribution of costs between inpatient and outpatient services was 79% (74-85%) and 21% (15-26%) respectively. This was consistent with findings from other LMICs (Mills 1990b), and some developed country settings (McPake 1992). The results show that the major cost component of inpatient care was recurrent costs, which constituted an average of 58% (ranging from 41-64%) of total hospital costs. Unlike the others, hospitals 2 and 5 had relatively high proportions of capital costs at 59% apiece. These proportional differences might be explained by differences in levels of capitalisation, and the type and age of equipment and buildings. This raises concern about the rationality of equipment purchase and use across hospitals. Currently, public hospitals do not individually budget for capital items. This is done at central level since the centre owns the assets. Such an arrangement creates inappropriate signals to hospital management and consequently affects the manner in which capital equipment is used and maintained. Lack of ownership is associated with indifference and lack of consciousness about the cost and quality implications related to use of equipment. The hospital staff has rights to use capital items without having to worry about costs of wear and tear, and replacement. Nevertheless, capital resource allocation is determined at central rather than local level, and problems associated are unlikely to be affected by hospital management. Furthermore, in four of the six hospitals variation in costs was largely explained by variations in recurrent costs. In addition, recurrent costs better reflected the impact of management and professional practice on costs and efficiency. This is because recurrent costs are a function of resource use patterns of managers and professionals in the delivery of services.

Table 11.0 Hospital ranking by relative efficiency (recurrent and total unit costs)

Hospital Ranking	Low					High
Hospital level:						
Cost per day (recurrent)	1	2	5	3	4	6
Cost per day (total)	1	2	3	4	6	5
Cost per admission (recurrent)	1	2	5	3	4	6
Cost per admission (total)	1	2	3	4	5	6
Cost per bed (recurrent)	1	2	5	3	4	6
Cost per bed (total)	1	2	3	4	6	5

Hospitals 1 and 2 had relatively lower unit costs per patient day and per admission at both ward and hospital level (Table 11). Activity levels partly explain Hospital 1 and Hospital 2's relatively low unit costs. The hospitals had relatively high bed occupancy and bed turnover rates. However, the two hospitals had generally similar demand levels as the others as evidenced by the number of admissions and patient days per capita (Table 5), which meant that there were other explanatory factors.

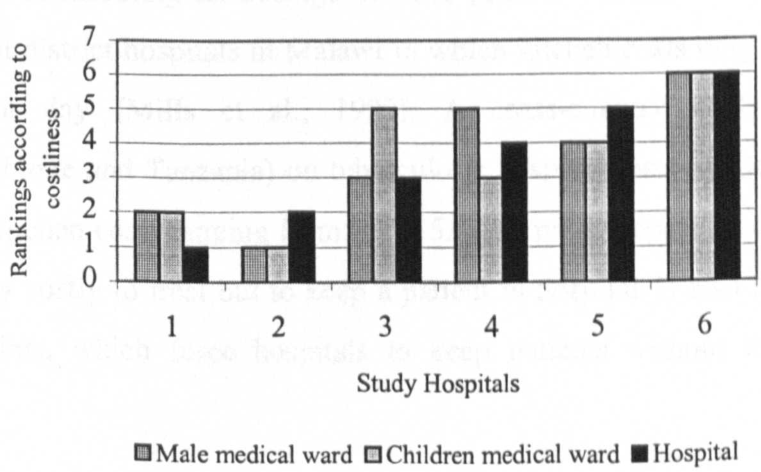
When recurrent costs are considered, Hospital 5 had medium costs per unit of output in most departments and even at hospital level. This was consistent with results from analysis of hospital service indicators. Its ranking changed when total costs were considered (Table 11). The total unit costs were invariably high and unexpected given its hospital service indicators. The high total costs per output were attributable to its high capital cost component, and internal managerial activities (see section 11.3.5). Hospitals 3 and 4 could be described as moderate performers (based on averages across the hospitals) as predicted by the Pabon Lasso analysis. The hospitals had a similar proportion of recurrent costs (70%) to total costs, which explained why they had relatively high recurrent unit costs and medium total unit costs.

Hospital 6 had consistently high costs per day and per admission. This is partly explained by relatively long periods of hospital stay (Table 5). The hospital had more beds per capita but comparable demand level for inpatient services. Excess capacity might explain the observed tendency to keep patients for longer (Morgan 1988). Low utilisation of beds meant that the hospital was vulnerable to periods of under-utilisation of staff and equipment despite the high bed occupancy (82%). In theory it is argued that the cost per day of acute cases decreases with the length of stay (Barnum and Kutzin

1993). The longer the patient stays in hospital the less the daily demands for diagnostic tests and other medical interventions. The hospital had costs per inpatient day of ZW$713 and cost per case of (ZW$5,024) (Figures 6.1 and 6.2). It may be argued that the aggregate effect of longer length of stay on costs per day did not outweigh that of low throughput or other professional and management practices (e.g. high resource use intensity).

At ward level, unit costs varied across wards and hospitals (summary Tables A7 and A7.1). These variations depicted underlying differences in utilisation levels and clinical practice. What is interesting is that a similar pattern of hospital ranking by ward unit costs emerged. Figure 11.1 illustrates hospital rankings using cost per admission for male and children's medical wards. Hospital 6 was consistently ranked the most costly whilst hospitals 1 and 2 were ranked the least costly. The observed similarities in rankings show within hospital similarities in the pattern of resource use across wards This is supported by the significant relationships found between ward unit recurrent costs per admission except for maternity and children's surgical wards (Table 6.4 and 6.5). Maternity admission costs were relatively low in hospitals 2 (ZW$572) and 5 (ZW$1,228) whilst hospitals 3 and 6 had costs of ZW$2,496 and ZW$2,060 respectively. The different hospital rankings might be attributed to different resource use patterns for maternity services. Differences in the proportion of normal deliveries, and admission and discharge policies across the study hospitals were probable contributory factors to cost differences.

Figure 11.1 Hospital ranking by recurrent cost per admission



b) Patient level.

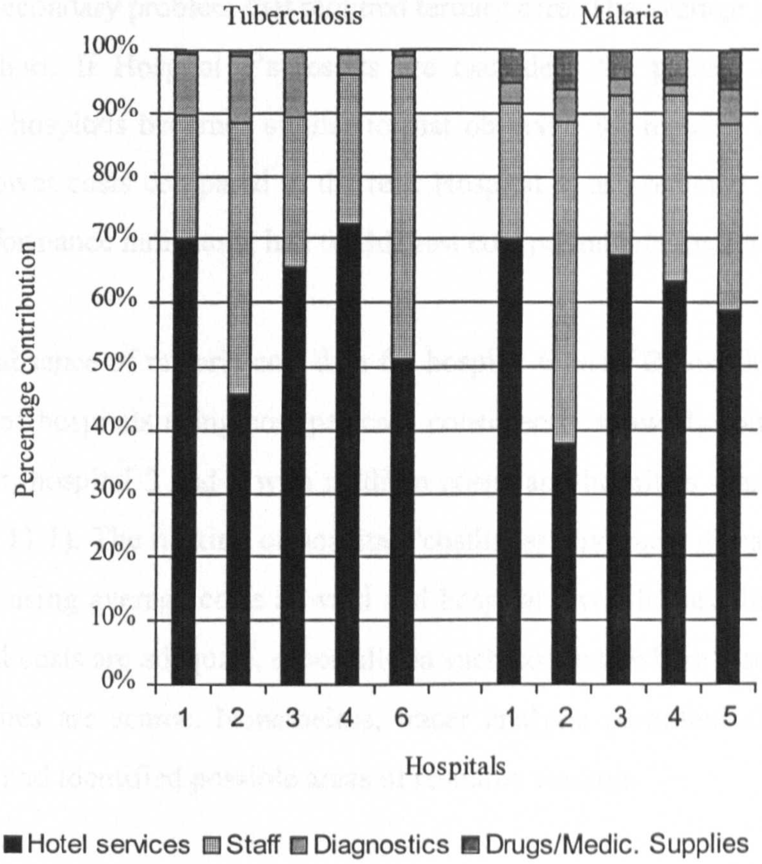
The results of tracer analysis showed that there were significant differences in case mix across the hospitals as evidenced by differences in proportions of severe and simple malaria cases, malaria length of stay and malaria positivity rates across the hospitals (Tables 7.2 and 7.12). The number of self-referrals was high (47% and 55% for malaria and tuberculosis respectively) which indicates two problems. Firstly, that the referral system was not functioning properly. Secondly, that the study hospitals had notable proportions of "inappropriate" use as a result of the poor referral system. A further analysis of how many self-referrals were actually inappropriate would have shown the magnitude of each problem. The fact that 42% (83) of malaria cases seen at these hospitals were simple malaria corroborates the argument that primary care services were being provided at these tertiary hospitals. The acceptance of by-passers of the referral system at tertiary level impacted on overall hospital performance. However, there was no relationship between referral status and malaria severity indicating that differences in proportions of self-referrals across hospitals did not explain case severity and hence costs (see Chapter 7). This implies that referring staff at lower levels of the health system bear some responsibility for the position of inappropriate use at tertiary level.

The average cost per case of malaria and TB were ZW$1,528 and ZW$2,203 respectively. These figures fall within the unit cost range established at hospital ward level analysis (ZW$554-5,000) except that the ranges of tracer costs were wider (e.g. the recurrent cost per malaria case ranged from ZW$144-5,580) which would be expected as the unit of analysis moves from ward to individual. The distribution of cost components per case was particularly insightful. The biggest cost component was hotel services contributing an average of 60% (Tables 7.1 and 7.11). Similar results were found at district hospitals in Malawi in which kitchen costs ranged from 56 to 80% per inpatient day (Mills et al., 1993). A cross-country study (involving Malawi, Mozambique and Tanzania) on tuberculosis hospital costs by De Jonghe et al., (1994) found kitchen costs ranging from 30 to 53% of patient costs. The results show that it is not only costly to treat but to keep a patient in hospital. It also reveals severe resource constraints, which force hospitals to keep patients without the technical resources required for treating them. Therefore, an extra day in hospital implies that hotel costs, equal to a high proportion of cost per day are incurred, irrespective of clinical activity.

The contribution of staff costs per case across the hospitals ranged from 21% to 50% for malaria and 19% to 44% for tuberculosis. Variations in percentage contributions are attributable to differences in staffing levels and grade mix. Low staff costs observed in this study were due to reliance on technical and auxiliary staff, and student nurses (especially in hospital 1). All six hospitals had training schools for nurses who provided a cheap source of hospital labour. The hospitals were considerably understaffed (see Chapter 8). Experienced and qualified staff was going into private practice or emigrating to neighbouring countries.

Drug costs contributed relatively little per case (about 3%). For malaria, this might be explained by the high proportion of simple malaria cases that are treatable with inexpensive drugs like chloroquine or pyrimethamine and sulphadoxine. De Jonghe and colleagues (1994) found a proportion of drug costs per TB case of 6%. Drug costs referred to in this case are not total drug costs per episode of TB but per episode of hospitalisation.

Figure 11.2 Distribution of Costs per Case of Tuberculosis and Malaria



A similar pattern of cost distribution across the hospitals is shown for malaria with the exception of hospitals 2 and 6, which had relatively high proportions of staff costs and low proportions of amenity costs per case. For instance, hospital 2 had 50% staff costs and 38% hotel services costs per case of malaria (see Figure 11.2). A comparison of mean costs per malaria patient across the hospital shows that hospital 1 had the least costs followed by hospital 2 (see Tables 7.4 and 7.14). Hospital 4 had generally high costs per case probably due to relatively longer lengths of stay and high proportion of severe cases. Hospitals 3 and 5 had intermediate costs. These cost differences are explained by variations in efficiency and/or quality of services. Use of auxiliary staff (as in hospital 1), alternative input procurement systems (e.g. provisions in hospital 2), and alternative ancillary service providers (equipment and building maintenance, domestic services and others) are some of the factors that might have influenced hospital cost variations between providers.

Hospital 3 had the lowest cost per TB case treated. This was because no patient was kept at the hospital once confirmed as TB positive, unless there was some other underlying secondary problem that required tertiary care. The average length of stay was atypically short. If Hospital 3's results are excluded; the pattern of cost variation between the hospitals becomes similar to that observed for malaria where hospitals 1 and 2 had lower costs compared to the rest. Hospital 6, as predicted by analysis of its hospital performance indicators, had the highest cost per tuberculosis case treated.

Despite the absence of malaria cost data for hospital 6 and TB cost data for hospital 5, the ranking of hospitals using cost per case consistently shows hospitals 1 and 2 with the least cost, hospital 3 and 5 with medium costs, and hospitals 4 and 6 with highest costs (Table 11.1). The ranking of hospital "costliness" by tracer disease dovetails with the rankings using average costs at ward and hospital level. It may thus be argued that hospital level costs are adequate, especially in such contexts where resources to conduct detailed studies are scarce. Nonetheless, tracer analysis permitted closer tracking of resource use and identified possible areas of resource wastage.

Table 11.1 Summary ranking of hospitals by tracer costs

Hospital cost ranking	Low →				High
cost per case: malaria	1	2	5	3	4
simple malaria	1	2	3	4	5
severe malaria	1	2	5	3	4
Cost per case TB	3*	2	1	4	6

Notes: * atypical because of the hospital's admission policy

What seems clear is that unit costs substantially varied across the hospitals, even for tracer diseases adjusted for severity (simple and severe). Case severity adjustment did not change hospital rankings but showed significant cost differences between simple and severe malaria which suggests that case severity had an impact on the length of stay ($p<0.01$[95]). Furthermore, differences in malaria case severity across hospitals were not explained by referral status (see Chapter 7). It would seem that cost variation amongst the hospitals was partly influenced by length of stay. The results are consistent with

[95] Using a T-test to compare mean LOS by malaria severity.

those from a severity study conducted in Australia (Beaver et al., 1998), but inconsistent with that of Lezzoni et al., (1996). Lezzoni and colleagues showed that case severity did not explain average LOS differences among hospitals but other factors like patient characteristics, practice patterns and institutional differences. Such factors were also contributory to the performance of the six case study hospitals (see Section 11.3.5)

11.3.3 Quality of hospital services

a) Hospital level

Aggregation of structural quality assessment results at hospital level was considered unnecessary. This was because an overall quality picture could be developed by looking at specific structural attributes of a hospital that are likely to influence the quality of services. It may be argued that the relative weighting of each attribute depends on the context. Weighting should consider the magnitude of the structural problem. This study considered three structural attributes, namely: staff, drugs and buildings because they are major problems facing public hospitals in SSA.

Notable differences in quality across the hospitals were found from a structural perspective. Human resources are an important input in the production of hospital services, and therefore variations in the quality and quantity of personnel reflect potential differences in quality of services provided (Sochalski and Aiken 1999). Clearly, none of the hospitals met the expected staffing standards for all staff categories (Table 8.2 and 8.3). Nevertheless, differences in medical staff categories (e.g. specialist consultants, general doctors, and nurses) were more apparent than in medico-technical and other supportive staff categories. Each hospital was expected to have seven specialist consultants to support the referral chain but only hospitals 5, 3 and 6 had at least a consultant. The absence of specialists at tertiary level meant that general doctors were referring cases to their peers at tertiary level. That can be interpreted as an indicator of poor quality tertiary care because the capacity of hospitals 1, 2, and 4 to provide acceptable tertiary services was low. This problem was also raised in the qualitative analysis (see Chapter 10).

All the hospitals had at least 50% of the expected number of doctors but there were marked differences in inpatient workload per doctor (Figure 8.1). Hospitals 5,3 and 6 had relatively lower doctor to patient day ratios if specialist consultants were included. Wide disparities in nursing numbers and mix were observed across the hospitals. Hospitals 6 and 1 had acute nurse shortages such that they relied on student nurses and auxiliary staff. Hospitals 6 and 1 had only 76 out of 234 expected nurses, and 110 out of 257 expected nurses respectively (Table 8.1). In sharp contrast, hospital 3 had at least 90% of expected nurses whilst hospitals 2, 4 and 5 had at least 50% of required nurses. These disparities become marked when workload per nurse is considered (Figure 8.2). Nursing care is a critical component of hospitalisation, and any deficiencies were likely to affect the quality of care profoundly both in terms of process and outcome measures. Staff grade mix was not markedly different across the staff groups. It would seem that the problem was more of staff availability than its quality.

Drug availability results need to be interpreted with caution because they are based on a limited list of essential drugs, and only four out of six hospitals (excluding hospitals 3 and 5). Drug assessments for hospitals 3 and 5 used analysis of tracer results as a proxy. In might be that drug availability for malaria and tuberculosis patients were not representative of the hospital situation. Overall drug availability was at least 70% across the hospitals, which is below the acceptable level of 80 % in Zimbabwe (Zimbabwe Essential Drugs Action Programme 1996). If fortnightly drug stock-outs are considered acceptable, drug availability becomes high (>80%) for some hospitals (Table 8.5). The marginal differences in drug availability across the study hospitals may be explained by differences in availability of financial resources and pharmacists, utilisation patterns, prescriptive practices and input procurement systems. Hospitals 1 and 6 had fairly consistent supplies. Drug shortages were more frequent at hospitals 4 and 5, and the duration of stock-outs was twice as long for the latter compared to the former. According to the tracer structural quality analysis, drug availability at hospitals 2 and 3 was classified as satisfactory.

The overall quality judgement for the six hospital buildings was based on the availability and quality of hospital space (especially ward space). Hospitals 1, 5 and 6

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score despite its structural constraints, which demonstrates the importance of understanding quality at lower levels—patient level. The following variables were the main sources of structural score variation: ward space, availability of hand washing facilities, availability of functional equipment, and presence of floor beds.

Quality results for simple and severe malaria were significantly different across the hospitals at both aggregate or disaggregated level (Table 8.7). None of the hospitals met the expected quality scores. Hospitals 3 and 5 had consistently lower structural and process scores for both simple and severe malaria whilst hospitals 1, 4 and 2 had relatively high scores (Figures 8.4 and 8.5). Unlike for PTB, protocol compliance varied across hospitals such that both structure and process contributed to the variation in overall score. These results might be partly explained, at a much broader level, by possible differences in the classification of cases into simple and severe malaria. There was a practical possibility that cases could have been classified in either group depending on the degree of compliance with the malaria protocol. For instance, the five cases of simple malaria at hospital 5 are suspect, especially if one looks at average cost per case (see Chapter 7).

The absence of comparable malaria data from hospital 6, and tuberculosis data from hospitals 3 and 5 rendered aggregation of patient level quality analysis unachievable. Both mean process and structural quality scores varied across the diagnostic groups and across the hospitals. However, the utility of the results was in highlighting specific areas of service strength and deficiency by hospital. All in all it would seem that hospital 1, 2 and to some extent 4 provided better quality of services as shown by the high and moderate ratings in all diagnostic groups. Hospital 5 had the lowest quality rating mainly because of its structural and delivery weaknesses. Hospitals 6 and 3 had better results than hospital 5 but nonetheless lower than expected quality scores. It is particularly worrying that all the hospitals failed to meet the expected minimum standards. Heidemann (1993) argues that minimum standards, unlike optimal standards, must be met, and anything below that is unacceptable. This is an understandable argument given the fact that minimum standards are set on the basis of what is viewed as achievable in practice (given available resources). Though all the hospitals had comparable structural capacity to provide services of minimal quality, hospitals 5 and 3 had considerably lower quality ratings. Interestingly, these hospitals had the highest number of specialists but their process scores were lower than the rest.

The divergence between some of the results of quality assessment at hospital and patient level clearly demonstrates the inadequacy of solely using non-patient specific methods of quality assessment. In addition, it also shows that structural assessments need to be interpreted in the context of process factors in as much as process factors need to be interpreted in the context of outcome factors. The results from hospitals 1 and 6 attest to that. From a supply perspective, both hospital and patient level assessments are useful in ensuring that hospital services are structured to optimise quality. If the quality definition is widened to encompass patient acceptability, structural aspects considered in the study are more likely, amongst other things, to be perceived as important by patients and would-be patients. As mentioned before this is because these are usually the major constraints facing hospitals in SSA.

11.3.4 Exploration of hospital cost-quality tradeoffs

The purpose of this study component was to attempt to answer one of the fundamental questions in hospital performance assessment: "When does high cost mean high quality and when does it mean low efficiency?" Some insights about the answers to this question enable us to understand relative performance differences between hospitals. The empirical exploration of cost-quality relationships in this study provided a number of useful revelations and observations. The findings show that hospitals 1, 2 and 3 were better performers in terms of quality levels achieved for the cost incurred. Hospitals 4, 5 and 6 had consistently high mean costs for comparable or lower quality scores. This suggests that resources in these hospitals could have been better used to achieve better results. This type of variation across the hospitals was similar to that found by Schulz and colleagues (1983) using a sample of 13 acute inpatient psychiatric units in the USA. Hospital costs and quality were mapped on a graph that located hospitals in different performance areas. Using qualitative research techniques they found that observed variations could be assigned to differences in management practices.

Resource use (costs) per case for all the hospitals fell short of anticipated levels (reference cost line). This was indicative of resource allocation problems or resource inadequacy. The framework used in this analysis was able to show that hospitals had problems of both technical and allocative inefficiency but the degree of each problem varied across the hospitals[96]. Therefore progress of hospitals towards the expected level of performance requires combined improvement in both technical and allocative efficiency. Interestingly, the results were consistent across the three diagnostic groups, and whether or not inpatient samples used for analysis were further randomised or not. Hospitals 6 and 4 were characteristically inefficient as evidenced by high unit costs and low or comparable quality, whilst hospitals 1 and 2 provided a contrasting scenario of low costs and better quality. The performance rankings were congruent to those found using the Pabon Lasso method, except in the case of Hospital 5 which was classified as technically inefficient in this analysis because it had comparable costs per case but lower quality (Figure 9.1). Common quality problems observed may have been related to the patient's physical environment and its impact on other process factors (e.g. overcrowding). High levels of utilisation in the face of limited personnel and resources might have encouraged use of "short-cuts" (non-compliance with protocols).

There are two main reasons for having some confidence in the validity of the results. First, the study focused on hospitals that are at the same level of referral hierarchy. Second, the three diagnostic groups (simple and severe malaria, and pulmonary tuberculosis) used contribute significantly to the disease burden in the country. However, there are also some significant limitations to the study design. First, the estimation of the expected performance levels was not definitive owing to the practical difficulties of estimating resource use and related effectiveness. There is not much empirical evidence on hospital resource use and effectiveness for most medical interventions. The use of local experts was the only feasible option at the time of the study. Second, costs calculated per case excluded overhead and capital costs. Hogan (1997) argues that this is a typical problem of organisational research, that is, its inability to produce patient-specific costs especially in the presence of large overhead or indirect costs. Third, the ideal comparison should have been between cost and outcome

[96] The distance of each hospital from the reference point signified the variations.

measures such as risk-adjusted mortality, readmission rates and others (Morey et al., 1992, Schulz et al., 1983, Fleming 1991). Nevertheless, the difficulties of measuring outcome quality cannot be underestimated. These caveats notwithstanding, the cost-quality model enabled a systematic exploration of costs and quality using tracers, and also created opportunities for exploring hospital efficiency questions. It was possible to characterise hospitals by their cost-quality performance, and relate the results to activity statistics analysis in Chapter 5. This linkage showed considerable congruence.

Any attempt to empirically grapple with the hospital cost-quality trade-off conundrum requires clarity in the definitions and measurements of costs and quality. The cost-quality conceptual framework used in this analysis could be applied to more hospitals in tandem with other methods that empirically construct best practice curves. Balancing of costs and quality has become inevitable in all health systems, and if any success is to be achieved, there is need to overcome the cost taboo[97]. As Eddy (1997) argues, "The biggest threat to both cost and quality in health care today is to be found in the cost taboo itself." The clash between medical ethics and costs is becoming more intense today in LMICs than in the past. The clash comes from the fact that clinicians are trained to do the best for the patient and not to save resources for the benefit of many. The latter entails some form of rationing care (e.g. prescribing low cost and possibly less effective drugs). Experience from high-income countries bears testimony to this inevitable and unenviable clash.

11.3.5 The relationship between performance and organisational factors

Performance comparison across the six case studies has shown that hospitals 1 and 2 performed better both in terms of costs and patient-specific quality of services. In contrast, hospitals 4 and 6 had relatively high costs for comparable or lower quality. A comparison of hospital 4 and 6 with hospital 1 and 2 clearly demonstrated that more could have been achieved with the same basket of resources per patient. Hospital 3 invariably had intermediate performance and hospital 5 had average unit costs and below average quality of services. The study sought to describe the institutional or organisational contexts under which hospitals realised observed performance levels.

Although the study did not focus on the effect of environmental factors on performance, the relationship between hospital performance and organisational factors needs to be understood and interpreted within the context of the prevailing environment. Background statistics show that hospital morbidity and mortality profiles were similar across the regions (Table 4.1). The profiles reflect the nature of the disease burden hospitals encountered in the respective regions. Availability of tertiary services as measured by the number of tertiary beds per population differed across the regions. For instance, region 6 (for hospital 6) and 5 (for hospital 5) had 2.6 beds per 10,000 people compared to a mean of 1.98 beds per 10,000 people. The utilisation pattern of hospital services (Table 5) shows hospital 1 (in region 1) with high patient-days and admission per 1,000 people of 70 and 17 respectively. Hospital 6 had the highest number of patient days per 1,000 people of 79 but an average admission rate of 11 per 1,000 reflecting its high length of stay. Observed hospital utilisation patterns can be explained by differences in demand for services. The functioning of the referral system influences demand. The coverage of secondary and primary care facilities was not markedly different in the study settings but results from tracer analysis indicated differences in proportions of non-referred admissions across the hospitals. Hospital 6 had a particularly high number of referred admissions for malaria cases of 91%. The study did not explore what proportion of non-referrals technically required tertiary level services (necessary versus unnecessary care). Such information might have provided further insights into the impact of the functioning of the referral system on hospital utilisation. It would seem that the hospital utilisation pattern is a function of internal and external factors, but clinical practice (admissions and discharge policies) plays the most important role in explaining it. Clinicians make the ultimate decisions on which patient to admit or not to admit whether referred or not referred.

Another important external variable to performance was difference in availability of resources. It might be expected that hospitals with more resources are likely to perform better than those with fewer resources though this expectation is complicated by the role that cost plays in the performance measurement. Hospitals 1 and 2 were relatively

[97] The notion that costs should not be considered in clinical decision making.

under-resourced (ZW$64,000/bed/year each) compared to hospitals 4, 5 and 6 with ZW$90,000, ZW$103,000 and ZW$93,000 respectively (Table 8.1). What was critical in this study, however, was differences in organisational effectiveness (quality of services) and cost (see Chapter 9). Tracer analysis showed that all the hospitals were under-resourced in absolute terms but nonetheless some achieved more from their expenditures than others.

The location of the study hospitals was indirectly associated with performance through its effect on staffing patterns, especially those specialist clinicians. It might be expected that staff availability and quality is likely to vary with access to cities (because of the attendant benefits) and potential for private practice. By policy, public consultants are permitted to do private practice as long as they are available when needed in public facilities. Currently, private practice in Zimbabwe thrives in urban areas where some people can afford to pay for private services. Hospitals 1, 2, 4 and 6 had one or no consultants even though they were within an average distance of 80 km from a big city. Hospital 4 is located about 262 km from the capital city but is located in a more urbanised setting than hospitals 1, 2 and 6. Hospital 6 is located in a relatively more rural regional setting with the least and dispersed population. Availability of nursing staff was particularly acute for hospitals 1 and 6 and the main reasons given in the interviews were lack of accommodation and other social facilities (e.g., good schools). Hospital 3 is located in the third largest city and hospital 5 in the fourth largest city in the country. It is therefore not surprising that the two hospitals had relatively more specialist consultants compared to the others (Tables 8.2 and A8.2). The shortage of doctors and specialists reflected the fact that those cadres had more discretion as to where they wanted to work. This emerged from the interviews, when clinicians were asked what kept them working in these hospitals. It would seem therefore that differences in the level of urbanisation, potential for private practice and other social factors contributed to differences in staffing patterns—hence differences in structural quality.

The study hospitals were part of a bureaucracy and therefore experienced similar hierarchical control in strategic spheres of management such as personnel, capital equipment, financial management and structuring of hospital functions among others. Within this veil of control, however, this study demonstrated that performance was variable. It would seem inadequate to explain the observed differences between hospitals using utilisation levels and input constraints alone without looking at other professional and medical practices, institutional characteristics and management practices. The question was: "what are some of these factors?" For discussion clarity, the hospitals are categorised into three overall performance groups: high performers (Hospitals 1 & 2), intermediate performers (hospitals 5 & 3) and low performers (hospitals 4 & 6).

The amount of slack in bureaucratic governance as evidenced by the degree of involvement of Hospital Advisory Boards in hospital activities varied across the hospitals. HABs were not only involved in fund raising but also in resource allocation decisions for hospitals through finance committees in which one member took part. The finance committee approved expenditure of funds from the Health Services Fund, which implies that HABs had some influence on management decisions. These management decisions were not only operational but also strategic in some cases (e.g., infrastructural development as in hospital 4). In fact, hospital managers indicated in the interviews that fee retention and HABs provided them the latitude to make quicker decisions based on local consultations. This they argued enhanced hospitals' capacity to respond to patient needs. For instance, instead of waiting for approval to acquire drugs out-of-stock at the central medical store, the administrator in consultation with the finance committee could use alternative sources, which they said were not always cheap but reliable.

The degree of involvement of HABs depended upon the amount of resources in the HSF and also the size of expenditure items. An analysis of hospital income showed that hospitals with active HABs such as hospitals 2 and 4 relied more on fee income and other resources mobilised from the community to meet budgetary shortfalls. At the time of the study, hospital 4 was solely relying on fee income and funds mobilised by the HAB to purchase patient food and meet domestic expenses. The rest of the hospitals had HSFs but no, or inactive HABs. This made use of HSF resources difficult and time consuming because of lack of legitimisation. When overall performance is considered, hospital 2, which had an effective HAB, had relatively better results in contrast to hospital 4's relatively poor results. The other hospitals without active hospital advisory boards performed variably. This provides little support to the hypothesis that HABs contributed to observed performance levels. However, on a case by case basis, HODs in hospitals 4 and 2 attested to the difference made by active HABs in reducing bureaucratic decision-making, and its positive impact on performance In addition, the attitudes of heads of departments in hospitals with HABs appeared different to those without HABs. In the former, HODs acknowledged local responsibility in resolving some of the hospital problems whilst in the latter everything was perceived to be resolvable by government alone.

The study sought to discover whether differences in operational management structures contributed to differences in performance. The rationale was that differences in the operational status of standard structures of management in public institutions influenced performance levels through information flow and co-ordination. The study showed that all the hospitals had the core management structure—the hospital executive. In hospital 1, the executive was inactive and its meetings were ad hoc. None of the supportive operational structures were active suggesting that input procurement and distribution might not have been rationalised, and clinicians had no formal opportunities to interface with the executive. Instead, the hospital had a functional efficiency committee. Unlike the drugs and therapeutic, and input procurement committees, the efficiency committee was proactive in that it was investigative and involved regular departmental visits by its members to check and discuss resource use issues. This meant that even though the hospital had no formal meetings, hospital efficiency issues were nonetheless informally shared and discussed amongst heads of departments. In contrast, hospital 2 had all mandated structures operating in accordance with bureaucratic expectations. Both hospitals had relatively better performance. Intermediate performers, hospitals 3 and 5 had equally diverse operational management structures. Hospital 3, like hospital 1 had none of its management structures functioning as expected and co-ordination of activities was therefore questionable. Its partner hospital, hospital 5 had all mandated management structures operational. This contradictory performance paring is also observed with hospitals 4 and 6. In hospital 4, the hospital executive and the input procurement committees were active except for the drugs and therapeutic committee. In hospital 6, we witness an active hospital executive but inactive input and drug and therapeutic committees. Failure of some management structures to function may be viewed as failure by management to co-ordinate hospital activities, or may indicate that other informal means of communicating and co-ordinating activities were used. Nevertheless, the study results show no systematic relationship between operational management structures and observed overall hospital performance.

The study hypothesised that hospitals which employ participatory management styles, are likely to perform better through regular consultation and information sharing among staff, a view shared by many commentators (Scott et al 1979, Knaus et al., 1986, Marriot and Harris, 2000). Evidence from this study failed to support this hypothesis. The high performers, hospitals 1 and 2 had contrasting scenarios. Management team members in hospital 1 operated informally but with what could be described as a high degree of individual responsibility for their technical mandates. Executive meetings were ad hoc and infrequent. There was no evidence of formal consultations of HODs on hospital-wide issues. Traditional structures for communication and discussions such as heads of department meetings were rarely convened. The operational structure was similar to what is often termed "professional bureaucracy[98]" in which there is limited formalisation, and professionals constitute the operating core (Flood et al., 1982, Perryman-Starkey et al., 1999). The situation was different at Hospital 2 where co-option of professional heads to executive meetings depended on agenda item. Heads of department were only co-opted to provide technical details of subjects pertaining to their area of specialisation and responsibility. However, HODs considered this type of involvement inadequate. It was clear from the interviews that they were interested in greater involvement and some were even proactive in engaging each other in discussing issues on rationalisation of services.

Hospitals classified as intermediate performers had similarly diverse management styles. Results from case study 3 show that although the operational arrangement was

[98] Hospitals are generally viewed as professional bureaucracies because of the dominance of professionals in their activities. In this particular case study, professionals enjoyed relatively more autonomy.

informal as in case study 1, there was compelling evidence of overt tension between administration and professional heads of departments. The latter highlighted the problem of lack of trust within the management team, and the apparent dominance of the administrative group appeared to fuel this tension. Formal managerial involvement at this hospital was essentially weak. Hospital 5 had a formalised approach to managerial participation where key professional heads were considered as part of the hospital executive. This meant that the operational hierarchy was flattened, and communication (both lateral and horizontal) and co-ordination of activities enhanced. The only salient omission in this strategy was specialist consultants who nonetheless expressed interest in involvement in executive decision-making. The low performing pair of hospitals (4 and 6) had one thing in common, and that was that management strictly operated in accordance with national policy, and therefore co-option of HODs was rare. Results for hospital 4 indicate that communication between the executive and staff was not considered a problem because all mandated meetings were held according to set schedules. The same was not true for hospital 6 where respondents argued that information was not shared adequately across staff.

Given this diversity in the degree of managerial participation across performance categories, it seems that managerial participation *per se* might not explain observed performance differences. However, questions could be raised about the nature of managerial participation (Marriott and Harris 2000), which might have influenced the observed results. If power relationships between staff groups are maintained then managerial participation is unlikely to influence performance. Some commentators, such as Becker et al (1980) argue that as long as there is effective co-ordination between medical and nonmedical departments there is no need for clinicians to be involved in management. Performance varied with both formal and informal management styles.

The study also looked at hospital differences in internal systems of resource use. One might expect that hospitals with decentralised operational systems of resource use and control would be more likely to be efficient. In other words, systematic deviations from standard bureaucratic procedures would yield positive benefits. What is clear from the results is that most hospital management teams appreciated the weaknesses of central budgets as evidenced by their endorsement of the idea of functional budgets. In both high performing hospitals (1 and 2), administrators saw control of resource-use as central to their work even though that was difficult to achieve given the internal structure. The link between the administrative group and clinicians was weak in hospital 1, and relatively better in hospital 2 where the head of the hospital had meetings with clinicians. It was not clear what was discussed in these meetings because there were no records. In hospital 2, the HAB was active and therefore decisions on the use of extra-budgetary resources were made by a finance committee which included members of the HAB. Hospitals 3 and 5 had centralised budget control systems and resource-use was in accordance with public procedures. The only difference between the two case studies was that the head of the hospital in hospital 5 was actively involved in administration (including budget control) whilst in hospital 3, the head of the hospital was not actively involved and most resource allocation decisions were made by the administrator. Both hospitals did not have finance committees, which also meant that administrators made decisions on use of extra-budgetary resources.

Two hospitals (4 and 6) that made innovative attempts to minimise the negative effects of central budgets had relatively high average costs. The experiment with shadow departmental budgets in hospital 4 was perceived by staff to be a success. However, this success can only be viewed relative to its previous performance and not with other hospitals. In hospital 6, attempts were made to engage clinicians and other staff in cost containment activities through persuasion and information sharing in meetings. The idea was to educate staff on resource availability and the need to save resources. Despite all these attempts, the two hospitals had relatively high unit costs. There is need to be cautious in interpreting the link between costs and budget control because only one hospital actually implemented shadow devolved budgets in the period under review. Evidence gathered in this study was insufficient to address the hypothesis that devolved budgets enhance efficiency. However, the finding that the majority of the respondents thought that departmental budgets could enhance hospital efficiency reflects structural weaknesses in the way resources are currently used and controlled. The general view was that current internal arrangements are inimical to resource use accountability.

Hospital input procurement and distribution systems in public hospitals are usually associated with budgetary control mechanisms. The study explored the ability of hospitals to acquire and distribute inputs and how this might have affected hospital performance. This was done by looking at the functional status of existing structures and how hospitals adapted these structures to meet hospital needs. Procurement committees were functional in four hospitals except in hospitals 1 and 3 where the administrator appeared to make most of the decisions on input supply. In hospitals 2 and 4, HABs were particularly active and extra-budgetary resources generated provided an avenue for quicker acquisition of essential inputs. The funds allowed management to acquire inputs (e.g. food items and drugs) without going through the government approval process. It would seem that the degree of flexibility in input procurement was determined by the ability of the hospitals to generate extra income. There was no other evidence, apart from the foregoing, of hospitals employing innovative strategies for acquiring inputs and internally distributing them. The only evidence of formalised attempts to control input use was found in hospital 1, which had an efficiency committee. Interviews showed that there were several uncoordinated input control and distribution activities at departmental level in the rest of the hospitals. The overall picture that emerges from these results is that procurement committees essentially followed government procedures when using budget appropriations, but had some discretion and flexibility over the use of other hospital income.

Hospital management capacity was assessed in terms of skills-mix, staff experience and ability to relate to clinicians. It might be expected that performance would vary with management capacity, and involvement of clinicians promoted hospital policy practice. At least 50% of HODs interviewed in hospital 1 (4/8) and hospital 2 (5/7) had received some form of management training, and average management experience was 5 years (Table A10.2). This was relatively high considering that the overall mean number of people with management training was 3 and the average number of years of experience was 6. Hospitals 3 and 5 had 7/10 and 1/7 HODs with management training, and the mean number of years of experience was 6 and 9 years respectively. Staff at hospital 5, though highly experienced lacked management training. In hospitals 4 and 6, 2/10 and 3/6 of those interviewed had management training, and mean years of experience of 4 and 6 respectively. The results show variation in both management training and years of experience across the hospitals. It would seem this pattern of variation provides limited support to the hypothesis that performance varied with management capacity. Hospitals 1 and 2 had, on average, relatively more trained and experienced managers, and performed well. What is distinct is that even though most of the cadres interviewed were experienced, they lacked management training. In addition, the ability of management in all the hospitals to involve clinicians in hospital-wide issues was limited.

Clinical practice is of central importance in explaining variation in performance (Wennberg et al., 1987b). The study focussed on what organisational factors potentially influenced the behaviour of clinicians, and their compliance with specific treatment protocols. Some studies have shown that clinical autonomy is associated with better care (Flood and Scott 1978) whilst others have failed to show that relationship (Becker et al., 1980). It was clear in all the case studies that the way hospitals are currently organised, in which clinicians do not have explicit departmental responsibility is not conducive to either clinical or resource-use accountability. In-charge nurses who had no control over clinicians managed hospital wards. In the wards, clinicians were only responsible for patient admissions, management and discharge. Clinician activities appeared divorced from other non-clinical activities or concerns. This lack of co-ordination increased the potential of clinical decision-making that did not support hospital efforts such as cost containment. Admission and discharge practices affect length of stay and ultimately cost—especially hotel costs as shown in this study. The problems were compounded by the exclusion of clinicians from hospital-wide decision making processes. Similar problems were observed in the UK NHS in the 1980s leading to the establishment of the Resource Management Initiative in 1986 (Farrar 1993). However, Farrar (1993) argued that changing physician behaviour required more than just managerial involvement but changing clinicians' payment systems so that performance was linked to clinical performance.

An analysis of tracer quality showed that there were variations in compliance with treatment protocols as revealed by differences in quality scores (Chapter 8). For instance, hospitals 3 and 5 had low mean process scores for malaria even though they had the highest number of specialist consultants (Table 8.8). Conversely, hospitals 1, 2 and 4, which had either one or no specialist consultant, had relatively higher mean process scores for malaria. Protocol compliance at hospital 6 was also high when tuberculosis treatment was considered (Table 8.7). It is particularly interesting that those hospitals that had specialist consultants had generally low protocol compliance (or variable clinical practice) whilst those that did not have consultants had high protocol compliance. There are two possible explanations. First, specialist consultants deliberately ignored explicit treatment criteria and relied on own knowledge and experience (using implicit criteria). Second, the presence of consultants did not influence clinical activities of general doctors who were more likely to deal with malaria and tuberculosis cases. It would seem that on the basis of process quality, the presence or absence of consultants did not influence performance or influenced it negatively. A major caveat to the foregoing is that protocol compliance *per se* does not necessarily mean positive outcome because non-compliance might lead to better outcome (Flood et al., 1982). It simply means that what was expected to be done to and for the patient was done (acceptable care).

A simplistic view of hospital technology was used to explore capacity differences in providing tertiary services. Technology assessment was considered in structural terms: staff mix and skills, drugs, and buildings. Section 11.3.3 (a) discusses the structural differences between the six hospitals. As aforementioned, differences in functional equipment endowment could have shed more light on capacity differences but lack of tertiary hospital equipment standards and time made the assessment impossible. The general service delivery frameworks were similar across the hospitals. All the hospitals contracted out laundry services to private providers. In addition, hospital 2 contracted out security and equipment maintenance, hospital 3 grounds-work and equipment maintenance, and hospital 5 grounds work. The major capacity differences were in staff, drugs and buildings as discussed above. Clinical services were not contracted out which meant that comparisons of clinical practice (and performance generally) across hospitals were not confounded by private practice behaviour.

Underpinning the relationship between organisational factors and performance was the incentive structure and its influence on staff attitudes and behaviour. It was apparent in this study that, at a macro level, hospital financing through annual budgets without any link to activities undermined organisational performance. Equally important was the payment of non-performance-related salaries and other benefits. The inclination at both hospital and individual level to maximise work effort and improve performance tends to be limited under such reimbursement systems (Barnum et al., 1995). This was a common feature across the study hospitals, which may help us explain absolute performance levels, but not necessarily relative performance.

The case studies also show that the current hospital internal structure where there are no budget holding departments or directorates, and limited involvement of doctors creates perverse incentives. These disincentives may be worsened by the manner in which hospitals are actually managed—management style. For instance, it was found that in hospitals 1 and 3 HODs and doctors were excluded from the general management of the hospital. This might have exacerbated the effect of disincentives generated by organisational design weaknesses. Hospital 5 provided a typical example where management made deliberate attempts to reduce the design effect (disincentives) by making some HODs "permanent" members of the executive. Proactive management approaches as evidenced in hospital 6 were clear attempts to be inclusive and build management consensus, and so was the co-option system used at hospitals 2 and 4. That, as other commentators argue reduces conflict especially with medical staff (Sloan 1981), and might enhance performance.

At individual level incentives/disincentives raised in this study were typical of civil servants in most LMICs. They were mostly monetary and/or related to working conditions or "hygiene factors"[99]. This is because people tend to think of types of incentives that are measurable and can more easily be linked to performance than security, prestige or power for instance (Wright 1991). It would be expected that with appropriate incentives, staff is more likely to be motivated to work harder and contribute to better hospital performance. For an individual to be motivated to work harder, the incentive rewards that s/he faces must meet a number of criteria: (1) distribution of the rewards must be seen to be performance based, (2) performance must be measurable and attributable to the individual, (3) the individual must expect the reward, and (4) realised performance level must not be used as the new minimum for the future (Handy 1993). It may be argued, *ceteris paribus*, that those hospitals with incentive systems that approximated to these criteria performed better. However, the majority of incentives reported in the six case studies did not meet these criteria, as they were mostly "hygiene factors". Such incentives are likely to increase work satisfaction and reduce turnover but not necessarily motivate staff to work harder.

Reported incentives were generally accessible to many without any observable link to individual performance. There were either no identifiable or generalisable systems of accessing non-monetary rewards within each case study. The concept of ward prizes mentioned in study hospital 3 was one isolated example with potential to induce ward staff to work harder, but its impact was most likely to be limited because it was used for individuals in one medical ward only. It is important to recognise that there was potential for hospital management to be innovative and to use rewards such as access to CPE and recommendations for promotion, as performance-enhancing levers. According to interviews, this potential was not exploited. Given that incentives were mostly perceived in monetary terms, it is not surprising that there was general similarity in the incentive/disincentive regimes reported across the hospitals. It seems therefore that differences in hospital performance were more likely to be explained by other non-monetary incentives particularly related to the hospital organisation, management structures, capacity and styles (see earlier discussion).

Because perceived incentives were largely monetary, it was inevitable that their strength in hospitals was dependent on wider economic and social factors. For instance, those hospitals that had subsidised accommodation and social facilities and were located close to or in major cities such as hospitals 2, 3 and 5 were favourably viewed. However, it

[99] A collective term coined by Herzberg (1968) in his two-factor theory for describing dissatisfying factors such as conditions of work—organisational policy and administration, supervision, salary, interpersonal

would not follow as discussed above that such incentives induced performance-enhancing behaviour among workers. Nevertheless, much can be learnt from what respondents raised as disincentives because the system had more reported disincentives than incentives. Addressing some of the disincentives raised such as lack of supervisory support, high workload, staff tension, input shortages, risk of infection and poor remuneration can form the basis of wider human resource development and strengthening of hospitals in general. All these factors are addressable in the long term and would require both institution-specific and system-wide changes to ensure optimal impact.

It is important to recognise that reported incentives or disincentives were created by both internal and external factors to the hospital organisation. It seems that performance enhancement can be achieved if external and internal incentives are mutually supportive. In other words, internal pressures on staff must complement external pressures exerted on hospitals or vice versa. The study showed that different staff groups sometimes faced different incentives because of internal operational arrangements and differences in opportunities for earning extra-income.

In sum, cognisance should be taken of the case study approach used, which attempted to identify and explore relationships and was therefore not expected to establish definitive causal relationships. It is important that further research picks up and tests variables suggested by qualitative evidence from this study to be important for performance, for example: presence of HABs, management skills and styles, information flow, co-ordination, supportive management structures, internal resource use and distribution systems, accountability, input procurement systems, hospital technology, organisation-based and individual-based incentives. The study's lack of success in demonstrating quantitatively, relationships between these variables and performance is not unexpected.

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relationships and physical working conditions.

CHAPTER 12 CONCLUSIONS AND POLICY IMPLICATIONS

12.0 Introduction

This chapter presents conclusions made from the study relating to public hospital performance: its measurement and determinants. It discusses the extent to which study objectives were met. It then presents the methodological, theoretical and practical contributions of the study. This is followed by a discussion of implications of the results for hospital reform in Zimbabwe and ends with suggestions for future research. Study conclusions are presented by the specific objectives of the study.

12.1 Measurement of hospital performance

The first objective of the study was:

a) *To use cost accounting methods to measure inpatient costs at both hospital, and patient level in six public tertiary hospitals.*

A prior performance assessment to hospital cost analysis was done using the Pabon Lasso framework. The method proved to be reliable for initial screening of hospitals. It made it possible to classify hospitals into performance categories. The method was fairly sensitive in reflecting performance levels of the study hospitals. A notable degree of congruence was found between its performance classifications and cost analysis results. Hospitals with high throughput had lower unit costs and the converse was true. Some commentators argue that the method can be used on its own to measure hospital performance (Mahpatra and Berman 1994). It is simple to apply but requires quality hospital activity statistics to generate quality results. Its simplicity makes it accessible to hospital managers and planners who usually work under pressure to make decisions. With this method, suspected poorly performing hospitals can be identified for further investigation.

Cost accounting methods were successfully used to measure costs of inpatient services at the six study hospitals. The costing process was time consuming and required innovation at every step of the method since cost and activity data were invariably not in the expected form. Despite the inability of the methods used to calculate marginal costs and to show whether or not economies of scope and scale existed, the study was able to demonstrate differences in resource use patterns (at hospital, ward and patient level) across the hospitals. The relative cost performance of the hospitals on a ward to ward basis was generally similar to that at hospital level. There were similarities in ward resource use patterns except for maternity wards in each hospital. It might be that unit costs for maternity varied according to the proportion that was normal deliveries. The study could not establish the exact proportions of hospital maternity cases, which were normal deliveries because of data aggregation problems. Observed unit cost variations were largely due to differences in recurrent costs, as they constituted a high proportion of total costs. However, two of the hospitals had high proportions of capital costs. There is a possibility that some of the capital structures and equipment at some hospitals were undervalued because of absence of audited equipment inventories with details for each piece of equipment and furniture. Furthermore, capital items were controlled from the centre and this arrangement negatively affected their effective management. For instance, there were no depreciation accounts and proper estate management.

Using tracer diseases, it was feasible to measure the costs of hospital services at patient level (cost per admission). The cost distribution per admission showed that the major recurrent cost component per admission was hotel services followed by staff costs. This points to the fact that differences in hospital admission and discharge policies and use of tertiary care generally were contributory to relative cost differences. With such a cost pattern, unnecessary admissions or delayed discharges are likely to have a significant impact on hospital costs. Drugs and medical supplies contributed a small proportion of inpatient costs. Unit recurrent costs calculated using tracer diseases reflected the order of magnitude of similar costs at ward and hospital level. It would seem that hospital level costing was probably adequate in understanding relative hospital efficiency given the costs (in terms of time and resources) of carrying out prospective disease-specific costing. Ranking of hospitals using relative unit costs per tracer produce similar results to the same exercise conducted at hospital level. This supports the sampling strategy of using service and facilities mix (by selecting hospitals at the same level—tertiary in this case) to control for case mix and severity.

The second study objective was:

b) *To determine appropriate methods for measuring quality of inpatient services, and to use them to measure quality of services in six public tertiary hospitals.*

The Institute of Medicine's definition of quality is comprehensive. In this study that definition was operationalised by looking at those few aspects of quality that could be measured given available data and resources. Global structural quality analysis (focussing on staff, drugs and buildings) permitted comparisons of overall hospital potential or capacity to provide quality inpatient services. Staff availability and quality assessment was made possible by the existence of national staffing standards. There were clear disparities in staffing patterns across the hospitals and the problem seemed more closely related to staff availability than staff quality. Differences in availability of drugs across the hospitals were a reflection of differences in procurement, distribution and use strategies, and demand levels. Absence of coherent standards for tertiary hospital buildings and equipment affected the objective measurement of these aspects. Because of that, hospital equipment inventory assessment results are not presented in this thesis. Development of a standard list of tertiary hospital equipment with each item weighted by importance would have addressed the problem. This could not be done due to time constraints. Nevertheless, building quality was assessed using three methods: observations, interviewing HODs and tracer analysis. The aggregate comparison across hospitals used availability of space as the key quality dimension. The three structural aspects of quality considered in the study are common concerns facing hospitals in many SSA countries. A caveat to this type of quality assessment is that although useful in its own right, it is broad and remote from patient care or experience. Structure does not tell us much about the process and outcome of care. That relationship is unclear. However, there is some evidence that staffing and skills mix (nurses and specialists) has an inverse relationship with mortality (Kovner and Gergen 1998, Aiken et al.,. 1999, Waterhouse and Trump 2001).

Patient level analysis using tracer conditions was used to review process-related aspects of inpatient service quality. The underlying rationale for using this approach was that hospitals are complex organisations with multiple inputs and processes, and by using tracers it is possible to explore the quality of these various facets of services. Indeed, it was possible to compare process aspects of inpatient care across the hospitals and identify which aspects of quality were deficient. Prospective methods of quality assessment using tracers (in homogenous groups) and explicit criteria, though time consuming, proved a reliable way of exploring inpatient quality where data problems exist. In this study, a small number of tracer diseases were used which were important but not necessarily representative of the hospitals' disease profiles.

On average the quality of inpatient services was high for the six hospitals when compared to the expected quality level. Relative differences in quality emanated from differences in clinical practice (or protocol compliance) and structure. The divergence between the results of global structural and patient level assessments for some hospitals confirmed the argument that structure *per se* is not an indicator of service delivery. Patient level assessment is therefore more useful in analysing service delivery quality because it enables explanation of the relationship between patient need and service delivery (process).

The third objective of the study was:

c) *To explore hospital quality-cost trade-offs using tracer diseases: malaria and pulmonary tuberculosis.*

Assessment of whether or not a hospital is efficient requires some understanding of the quality of services. As discussed in Chapters 6, 7 and 8 measurement of these parameters is subject to constraints depending on which approach is used. The manner in which costs and quality are defined and measured affects the nature of the relationship between these two measures. The cost-quality trade-off framework used in this study was able to distinguish hospitals according to their relative performance and in reference to the expected performance. The framework was also able to locate hospitals in a way that allowed some interpretation to be made of relative technical and allocative efficiency. The results indicated that, among these hospitals, there were divergences in the relationship between cost and quality. Hospitals 1 and 2 were judged to be relatively more technically efficient, hospitals 3 and 5 intermediate, and hospitals 4 and 6 least efficient.

These conclusions need to be viewed within the context of the limitations of the cost-quality model derived from the measurement of costs and quality. It was not possible in the study to construct best practice curves for the chosen tracers. This was because of practical difficulties associated with lack of evidence on the effectiveness of different combinations of inputs (medical interventions). That notwithstanding, the adapted model (based on expected reference lines) enabled a systematic exploration of costs and quality, and relative performance.

12.2 Hospital performance and internal structure

After measuring hospital performance, the study sought to meet these two specific objectives:

(1) *To describe the internal organisation and management of public hospital services, and associated incentive structures, and (2) to analyse how incentive structures, internal organisation and management relate to costs and quality of services.*

It was clear that public hospitals in Zimbabwe operated under a constrained environment owing to lack of autonomy in strategic management domains. Internal structure was characterised by central control and minimal involvement of operational managers and clinicians in making hospital-wide decisions. Departments were not accountable for resource use because there were no effective mechanisms for accountability. Budgets were centralised and the locus of control was with the hospital executive (or administrators) while doctors, nurses and others who have no budget responsibility control resource use. Incentives for cost containment and efficiency were largely absent. Policy prescribed supportive management structures such as finance, procurement and drugs and therapeutic committees were present and functional in some hospitals and absent in others. This created a situation where key activities pertaining to rationalisation of hospital activities (e.g. rational use of inputs, information exchange and co-ordination) were not formalised. The current internal structure is not conducive to high performance or organisational effectiveness. Hospital financing strategies are equally not supportive.

Hospital workers face an incentive regime that does not support performance-enhancing behaviour. First, the design of the management structure itself creates disincentives for key hospital cadres such as clinicians because it does not provide for their effective involvement and sharing of information and responsibilities. This provided the weakest link between hospital policies and actual practice especially in a system where clinicians still wield considerable power by virtue of their social status. Accountability structures for clinicians were weak because of lack of explicit supervision mechanisms. Second, staff reward systems were not related to performance, and this was compounded by unsupportive management practices (styles). The study showed that monetary incentives were viewed as the important form of incentives. Moreover, the majority of incentives in these hospitals, however small, were structured to “satisfy” and not necessarily to “motivate" staff because they were not related to performance. If at all some rewards were performance-related; the system was so unstructured that this study could not gather supportive evidence. It is therefore not surprising that, all in all, staff attitudes towards costs and quality of hospital services were largely apathetic despite a high degree of staff awareness of these problems.

The six case studies provide diverse institutional contexts and variable performance levels. The study draws some conclusions based on the hypotheses highlighted in Chapter 10 concerning possible relationships between specific institutional characteristics and performance:

- There was little evidence from the study that the degree of participation of the HAB influenced performance. Having or not having an active HAB could not be associated with performance differences across hospitals. Hospitals 2 and 4 that had active HABs performed differently as did the other hospitals. However, in absolute terms an important finding was that heads of departments of hospitals with active HABs attested to enhanced local decision-making and flexibility associated with mobilisation and utilisation of extra-budgetary resources. They argued that extra-income improved the capacity of the hospital to respond to patient needs, and resolve some problems locally.
- No systematic performance differences were observed according to operational differences in the management structures. It would seem that mandated structures do not work, and that some innovation applied in hospitals 1 and 2 might be helpfully standardised across hospitals (e.g. creation of an efficiency committee, and effective co-ordination between medical departments and clinicians).
- Evidence obtained from this study does not suggest any association between the level of managerial participation and performance. Diverse management styles, and capacities to engage heads of departments and clinicians in hospital-wide issues characterised the hospitals. The actual nature of managerial participation (not pursued in this study) might have affected this relationship. It would also seem that co-ordination between departments should be based on what mechanisms are favoured by staff, that is, formal (planned meetings) or informal (unplanned meetings) rather than based on policy prescription.
- The majority of the study hospitals had centralised resource use systems, and therefore little evidence was gathered by the study to explain relative performance differences in these terms. However, if performance is compared on a case by case basis, hospitals that made attempts to deviate from standard bureaucratic approaches of resource use and control were perceived to have achieved better results compared to previous years. This means that although "decentralised" resource use patterns could not be associated with performance differences across the hospitals, they may have had an impact on individual hospitals' performance (Hospital 4, for instance).
- Management capacity both in terms of management skills and training varied across the hospitals suggesting that the relationship between management capacity and

relative performance was not definitive. For instance, at least 50% of respondents at hospitals 1 and 2 had management training and considerable experience but so were respondents at hospitals 3 and 6. It might be argued that management capacity is a structural attribute of a hospital organisation and therefore its relationship with performance can only be understood by looking at managerial processes (e.g., capacity to engage staff). The skills mix and management training of hospital managers was poor across the hospitals.

- The behaviour of clinicians in public hospitals could be associated with the internal organisational and management structure. The position of clinicians within public hospital organisations did not place pressure on their clinical activities to consider hospital-wide issues. This scenario applied to all the study hospitals. Variations in treatment protocol compliance, however, suggest differences in professional and medical practices, which might have influenced relative performance. Drugs and therapeutic committees whose role was to ensure compliance with treatment guidelines and rational use of drugs were not functional in most hospitals, and where functional they met irregularly. It may be concluded that although there were structures in place to standardise clinical practice and rationalise resource use, these structures were non-functional and therefore ineffective. Similarly, the presence or absence of specialist consultants did not seem to affect protocol compliance. This might be explained partly by lack of clinical meetings.
- The study explored the hypothesis that hospitals with adaptive operational mechanisms for procuring and distributing inputs were likely to cope with internal demand and therefore perform better. In the majority of the case studies, the procurement committee operated in accordance with government input procurement procedures. There was minimal flexibility when using budget appropriations in comparison to when using extra-budgetary hospital income. Innovative strategies in internal input distribution systems where observed at hospital 1 (the efficiency committee), and in hospital 4 with shadow devolved budgets where HODs had to keep commitment registers and input stock-cards. However, there was little evidence of innovative input procurement and distribution activities, and lack of a systematic association between such activities as were identified and relative performance to

support the hypothesis. It was nevertheless evident that the general system of input procurement stifled innovation and that influenced absolute hospital performance.

These conclusions need to be viewed within the context that they are based on only six case studies. In summary, what seems salient from the study is that those hospitals that made systematic attempts to depart from bureaucratic management procedures were acknowledged to have achieved better absolute (rather than relative) performance results. What is particularly important is that the study demonstrated that hospitals have different internal (operational) contexts and should therefore not be treated as homogenous entities even if they have similarly designated roles in the health system. Considering one or a few organisational variables as surrogate for others in evaluating hospitals (e.g., Pauly and Wilson 1986, Al-Haider and Wan 1991) carries the risk of classifying different hospitals as similar. The foregoing might lead to inappropriate policy prescriptions. The study showed that there were marked differences in management capacity and styles, degree of involvement of HODs and clinicians, staff tensions and power dynamics, internal communication and co-ordination across the hospitals. These factors affect hospital performance in a variety of ways. One such way is through the incentives and disincentives that these organisational factors create for different staff categories. It would appear that the multiple inter-relationships between these factors, and the absence of clearly superior or inferior constellation of factors has precluded the identification of clear causal relationships. More research is required to further elucidate the effect of these organisational factors.

12.3 Methodological contribution

Hospital performance has traditionally been measured using singular approaches: input productivity or costs or quality of services. Rarely has it been measured comprehensively as attempted in this study. The study first subjected the hospitals to an analysis of utilisation indicators, which was followed by an assessment of costs and quality of services. Assessment of quality of services has generally been ignored or inadequately factored into hospital efficiency assessments regardless of method sophistry. This is not surprising given the complexity of hospital organisations.

Significant strides in the measurement of quality of services have been made in developed countries with the advancement of information technology but very little has occurred in LMICs.

A combination of bottom-up and top-down costing methods was used in order to optimise merits and minimise demerits of both methods. Standard step-down methods yield unit costs that may obscure inefficiencies (e.g. costs of expired drugs and other wastage) whilst use of prospective costing methods at patient level allows estimation of unit costs that reflect better the underlying production function. Use of prospective methods in contexts where data are usually incomplete and of poor quality yields valuable and insightful results. Through this method it was possible to establish the distribution of costs per case.

The measurement of quality of health services, and especially hospital services in LMICs poses major difficulties. Global hospital structural assessments gave a sense of hospital capacity differences in potentially providing quality inpatient services. The study also employed tracer conditions to prospectively explore the quality of hospital inpatient services. The underlying assumption was that tracers would allow an exploration of various components of hospital services (pinpointing quality concerns) as patient go through the hospitalisation process. By following patients from admission to discharge it was possible to assess and compare what was done to and for the patient versus what ought to have been done to and for the patient. This was rare in that most quality assessment studies that have used tracers have done so using retrospective data.

The relationship between cost and quality remains a conundrum despite the existence of illustrative conceptual models in the literature. Empirical evidence to date on this relationship is equivocal. The cost-quality framework used in this study was driven by patient-specific data and facilitated an analysis of relative performance across the hospitals. The quality measurement used captured both structural and process dimensions.

Use of qualitative methods in exploring and developing a deeper understanding of possible determinants of hospital performance is a notable methodological contribution to the small body of available literature. One of the problems associated with quantitative methods in measuring organisational performance is the difficulty of incorporating the range of possible organisational factors into the models. The problem is compounded by the fact that the majority of these factors cannot readily be measured in quantitative terms. Although qualitative methods cannot demonstrate causal relationships they provide the latitude for detailed analysis of behavioural factors and organisational contexts within which different performance levels are achieved. It is through this process that hospital performance and its determinants can be further understood.

12.4 Theoretical contribution

This study represents one of the first attempts to approach hospital performance assessment using a non-traditional conceptual framework. It argues that internal organisation and management impacts on performance, and the effect of factors such as clinical practice, cost and quality control activities on performance is not just physical but based on the perceptions of those responsible for them. Concepts of organisation theory (such as internal structure, management styles, motivation/incentive and social comparison theories) have a contribution to make in exploring and understanding hospital organisations. The case studies' results demonstrated that observed performance is an outcome of complex relationships in internal structural and behavioural factors. The traditional engineering approach (input/output approach) to measurement of organisational performance (especially hospitals) needs to be complemented with a thorough analysis of the institutional context. It would seem that performance improvements might be fostered through creation of the appropriate organisational contexts.

12.5 Practical contribution

Information generated by the study is useful in a number of ways. First, it fills a gap in our understanding of hospital cost structures, efficiency and resource flows in Zimbabwe. There has not been any previous detailed analysis of tertiary hospital costs in the country apart from isolated project-funded pilot studies that become ends in themselves. Unit cost information can be used to design fee structures that ensure effective cost recovery programmes—and hence contribute to hospital financial autonomy. Second, data on costs and quality can be used to support decision making on matters concerning hospital funding levels and options (through grants or service contracts), contracting out of services and monitoring of hospital performance. Third, the hospital sector is undergoing reforms (e.g. entrusting hospitals with greater autonomy and contracting out of some services). If reforms are to succeed they must be tailored on the basis of facts and empirical data to ensure policy impact. The study highlights the nature of current organisational and management problems in public hospitals and that for reforms to achieve expected results they must create and align appropriate incentives to enhance performance at both individual and institutional level. Evidence from the case studies suggests that hospital reforms are likely to meet intended objectives if they are perceived to be essential by the relevant constituency, and if they address what individual providers perceive as important in changing their behaviour and hence that of the hospitals. Fourth, the results provide detailed baseline (benchmark) data for future evaluation of hospital reforms. Besides, organisational reforms are expensive and time consuming and require therefore empirical evidence to increase their chances of success.

12.6 Policy implications

A number of policy implications (both specific and general) can be drawn from this study. These include:

- Affording hospitals greater autonomy in operational and strategic areas of management: for example, finance, personnel, service delivery options (self or contracting out services, estate and equipment management appears worthy of further consideration. This could take the form of entrusting hospital advisory boards with greater governance and strategic powers as currently proposed or establishing entirely new management boards. The process of doing so should be gradual given the observed lack of managerial capacity across tertiary hospitals. The major policy marker to such changes is that there must be interest and willingness for change amongst the relevant constituency affected by that change, since in addition to readiness, this may indicate confidence in hospital management among hospital workers.

- Current systems of financial management control do not contribute to performance improvement because they are structured to monitor general expenditure but not to track (or monitor) expenditure patterns by source. There is scope for improving hospital efficiency by ensuring appropriate use and managerial control of recurrent costs. There are grounds for saying that management and responsibility for capital costs (depreciation and replacement) should be decentralised to the hospital level.

- Strengthening hospital management capacity: Investments in management training to date have been broad and not focused on specific hospital management needs. Hospital heads and administrators need to be exposed to the concepts of general management (including estate management, personnel management, public relations, designing contracts, the contracting process, managing contracts and financial management). This type of training would give managers an overview of how macro and micro-decisions can influence the overall performance of the hospitals. As it stands, hospital management is taken as an add-on activity to a senior clinician's activities. Evidence from the case studies showed that the hospital management is often allocated to clinicians without requisite training (or experience) to meet the challenges of looking after both workers and patients. As a result, staff tensions are frequent, staff morale is low, resource management is poor, and that inevitably affects the quality of services. Management of a hospital is much more complex than management of a supermarket for example, and therefore medical superintendence should practically be viewed as a full-time managerial job.

The concept of introducing chief executives at national referral centres (as at Parirenyatwa central hospital) is a move in the right direction.

- Reorganisation of hospital internal structure: the way public hospitals are currently organised internally does not support efficient behaviour. Selected clinicians and other HODs (medical and nonmedical departments) need to be given departmental responsibilities including budget management. This could be an adaptation of the clinical directorate system in the UK NHS (introduced under the Resource Management Initiative) where each directorate receives a budget with incentives for cost containment (e.g. retaining budget savings) and quality improvement. Hospital administrators would retain overall responsibility for the hospital budget with the assistance of administrative clerks in each directorate. Clinical directorates could be established according to broad diagnostic groupings such as medical, surgical, maternity, orthopaedic, outpatient/casualty and others. Currently, wards are operationally overseen by sisters-in-charge who have no control over clinicians. Nevertheless, it is clinicians who control resource use. This form of restructuring would create more staff awareness of costs and quality of services, and resource-use accountability. Farrar (1993) argues in the context of UK NHS that involvement of clinicians in management may not lead to improved hospital efficiency because of the inherent differences in the underlying objective functions of doctors and administrators. Giving selected clinicians more say over use of resources may allow them to pursue their own objectives, which might be at odds with efficiency improvement. Similarly, self-selected clinicians may choose to become administrators thereby defeating the purpose of addressing conflicting objectives of administrators and clinicians. She argues that one way of counteracting such behaviour would be to link "good practice", monitored by adherence to standards, with immediate financial gain rather than distant threats of specialty closure or contraction. The case studies showed that the popular incentives among hospital staff were monetary, which supports the plausibility of Farrar's suggestion in the Zimbabwe context.

- To ensure that clinical practice conformed to national guidelines (EDLIZ 1996) and hospital specific policies, drugs and therapeutic committees as currently constituted, must compulsorily be held at regular intervals, and a systematic process of continuous professional education for medical staff must be established. The potential benefits of having such hospital committees were not being realised because they were simply not operating as expected. Expanding their mandate to include quality assurance activities or by establishing separate but complementary quality assurance committees could also enhance the impact of drugs and therapeutic committees.

- As mentioned earlier, the system of input procurement needs greater flexibility if hospitals are to better respond to patient needs, and take advantage of market opportunities. Although central procurement has inherent advantages (economies of scale), poor functioning of the government central medical stores has affected hospital activities by causing delays and consequently unnecessary expiry of drugs. However, flexibility in input procurement requires checks and balances at national and regional level to minimise opportunistic behaviour. It is necessary that appropriate audit systems are instituted first to discourage such behaviour. Moreover, hospital internal input distribution systems are likely to improve with the introduction of departmental budgets.

- If all the above suggestions are to work as intended, reward systems for hospital staff must be restructured accordingly. Systems of performance related rewards (e.g., salaries, bonuses, merit awards, training, promotion, job enrichment and enlargement) for staff needs to be introduced in ways that channel staff efforts (or motivation) towards improved hospital performance. This is not an easy process but a vital one if the behaviour and attitudes of staff towards costs and quality are to change for the better. To nurture performance-enhancing behaviour, good practice must be rewarded and poor performance discouraged. The reward system must be as transparent as possible such that all staff are aware of the immediate benefits of good practice. However, in a hospital situation difficulties may be encountered in identifying good performers because of the jointness of activities between staff (for example nurses and doctors). In practice, that role can only be played by immediate supervisors using locally (or nationally) agreed standards of assessing good practice. A review of empirical evidence is necessary before decisions about which systems to adapt are made. Alternatives include systems of performance related pay and merit awards in education and health in the UK, and doctor's bonus systems in China.

- Strengthening the referral system: In order to ensure appropriate use of tertiary hospitals there is need to strengthen the referral system through deliberate policies (e.g. penalty fees for by-passers), increasing coverage and quality of primary and secondary care services (especially in urban areas where these hospitals are located). A significant proportion of hospital costs can be reduced through minimising unnecessary hospitalisations at tertiary hospitals. The major cost component per case found in this study was hotel services suggesting that decisions on whether or not patients required inpatient or outpatient care had marked influence on hospital costs. Hospitals need to develop admission and discharge guidelines for use by clinicians. The option of using one admitting and discharging clinician, though plausible, would create problems because of the acute shortage of doctors in the country.

- Establishing an essential package of tertiary services: Related to the above point is the fact that, unlike secondary hospitals, the specific role of a tertiary hospital is not clearly defined. The majority of tertiary hospitals provide significant amounts of secondary care and that creates confusion in the referral system. Setting out the essential package of tertiary hospital services would assist in the rationalisation of hospital admission and discharge policies, and clinical practice in general. Both technical and allocative efficiency would potentially improve. In additional, hospital technology (loosely defined as equipment, staff, and buildings) would be equally rationalised for tertiary services.
- Methods of hospital funding need to be reviewed to ensure that hospitals respond better to patient needs and are accountable for resource use. This requires establishing systems of monitoring hospital performance on a regular basis.

Current reform proposals in Zimbabwe on hospital autonomy and introduction of service contracts point in the right direction but require thorough analysis and major refocus. Two important aspects of the reform process must be considered:

(a) Appropriate packaging of hospital reforms: This is crucial for policy success. The tendency in the past has been to implement policies that target specific organisations or staff groups (e.g. administrators or managers) without targeting all key groups so that they work collectively towards achieving the intended policy goals. The result is that some policy targets are met at the expense of others. For example, waiting lists are reduced at the expense of quality of care. It is important that reform policies are designed to create appropriate incentives to meet intended goals. Incentives so created must focus on both individuals and organisations. This would not only enable reforms to change systems for better performance but also change staff compliance with the new systems. Staff attitudes towards change are a function of their perceptions of the need for that change. Changing systems without concomitantly changing staff behaviour might create unintended consequences.

(b) Incremental reform implementation strategies: Good reform policies many times fail to achieve their intended goals because of the way they are implemented. Implementation of hospital reforms must consider capacity differences across hospitals. It may be argued that gradual and experiential approaches are more likely to increase policy practice and impact. This entails prior consideration of a number things, namely: provision of adequate resources (because reforms are not cost free), clear guidelines on how things should be done, and audit systems that engender good practice.

12.7 Areas for future research

Unravelling the complexities of hospitals remains an under-researched area. Hospitals are dynamic organisations whose behaviour needs to be understood in the context of prevailing circumstances. This study attempted to not only measure hospital performance but to also qualitatively explore the relationship between institutional contexts and hospital performance. However, in the light of the study findings, there is scope for enhancing our understanding of hospitals by improving the focus, scale and methods used in this study.

(1) Improvement of methods for adjustment for case mix and case severity in LMICs. Literature shows that case mix and severity differences explain a great part of cost differences across hospitals. This study used facility and service mix as crude measures of case mix and severity, which might have obscured some differences. Statistical approaches can be used to compute case mix and severity indices or adjusters using locally collected hospital information (for example disease classifications, age, sex and weighting systems), which can be used in tandem with cost accounting methods such as those used in this study. The interpretation and conclusions to be drawn would become firmer. However, no system of patient classification can generate entirely homogenous groups that are also practically manageable. The aim would be to minimise variation in patient characteristics within groups and maximise variation between groups.

(2) Further exploration of hospital cost-quality relationships: This may be done by looking at service outcomes adjusted for case mix, case severity and costs with larger sample sizes. Recent studies on quality of care are increasingly focusing on outcomes, and attempts to implement similar studies in LMICs would be insightful. Finding methods for measuring and explaining outcomes in contexts where there are data problems is a major research challenge in itself. The "staging method" where the condition and history of cases is noted at admission (to assist in the prognosis) may be used to address this attribution problem. Furthermore, this study was not able to construct "best practice" cost-quality curves for use in mapping out hospital performance. This can be pursued further by thorough examination of existing literature, and consultations with local experts. Understanding cost-quality relationships in this way requires much bigger studies with larger sample sizes.

(3) Understanding hospital behaviour is important in understanding hospital performance. The study lacked the guidance of an underlying hospital behavioural model and, further empirical evidence and conceptual thought would be needed to help articulate one. The development of a hospital model can be explored through studying

hospital objective functions of key hospital staff categories using both statistical and qualitative methods. The implicit assumption of that would be that by understanding the behaviour of individuals and groups within the hospital we may infer the hospital objective function. This is important if we are to understand and predict hospital behaviour. Crilly (2000) used qualitative and quantitative methods in trust hospitals in the UK to explore the objective functions of hospital staff. In addition, to studying hospital staff views on what hospitals aim for, community views on the role of the hospital can also be captured using qualitative methods and compared.

(4) This study was able to show that internal organisational and management factors such as internal structure, management capacity and styles, incentives, level of involvement of HODs and clinicians, staff tensions and power dynamics, internal communication and co-ordination are important for hospital performance. A deeper understanding of the effect of these dimensions of public hospital performance in Zimbabwe requires a series of focused studies looking at the specifics of each dimension over a larger number of hospitals. One approach of to this would be to search for natural experimental sites where some hospitals exhibit certain characteristics of interest and others do not. The effect of specific factors can then be explored in a more structured manner. Intervention studies could also be carried out, focused on these factors in the local context. The rationale of such studies would be to elucidate specific aspects which when considered together could provide a broader picture of how hospitals function.

(5) This study was able to show differences in resource use patterns across hospitals but was unable to measure marginal costs and whether or not economies of scope and scale exist. Although this would have been relevant to a slightly different research question, it is still important that the issue of hospital size be explored given that some hospitals in the study appeared to have excess capacity (which in turn seemed to influence managerial and professional practices). Such information is important for decisions related to expansion and contraction of hospital services. It could be that some hospitals are performing poorly because of they are either too small or too big given current levels of utilisation.

(6) Need for evidence based reforms: Any reforms in the health sector should be preceded by a thorough review of the current situation noting specific strengths and weaknesses. Such context specific evidence is valuable in deciding whether to reform or not, and in adapting and adopting reform policies for optimal impact. Reforms must be guided by need and not by fashion. Implementation of reforms will now be evaluatable against this baseline.

In sum, understanding hospital performance and its determinants is a complex process that requires innovative approaches to tackling the myriad of potential factors involved. As shown in this study and other studies before, tackling all the potential factors (quantitatively or qualitatively) in one study is practically impossible. The challenge is in identifying relevant factors to consider under different circumstances. Whilst qualitative approaches might not establish causation, they allow for a deeper understanding of internal factors (or institutional characteristics/performance context) especially from the views of individuals or groups within the organisation. It is the individuals or groups within the hospital organisation that influence its behaviour and hence its performance.

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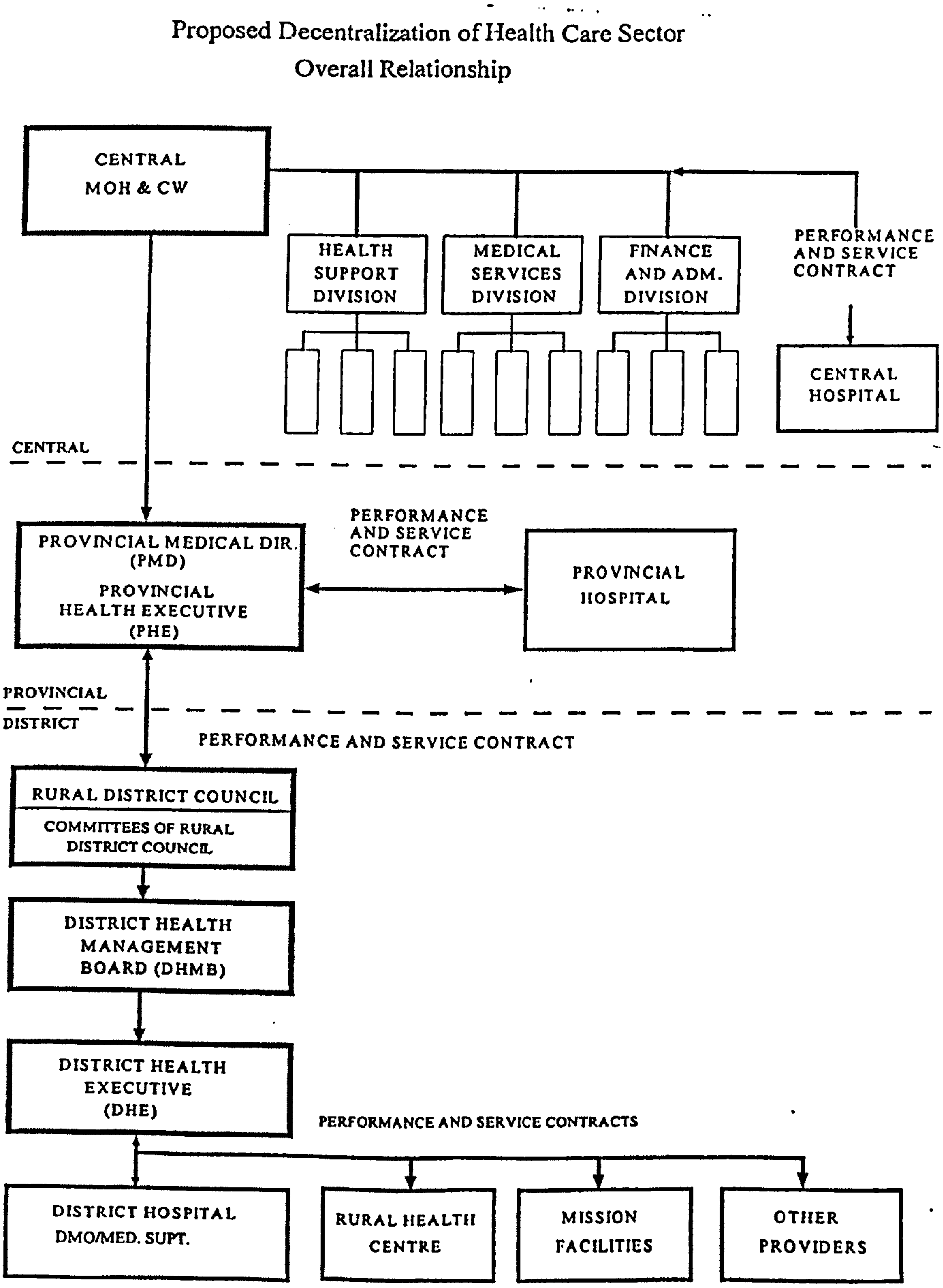
Annexes

Annex I Proposed Decentralisation of Health Care Sector: Overall Relationship



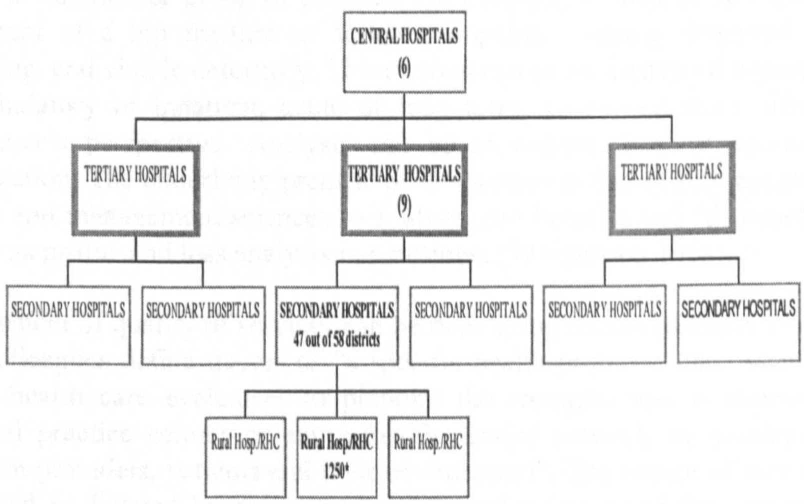
Source: MOH&CW (1997).

Table A1.0 Ministry of health expenditure by level of health care

Level	% Share 1992/93	% Share 1994/95
Parirenyatwa*	15.8	9.4
Central hospitals*	22.9	24.2
Provincial hospitals**	10.2	11.2
General hospital***	5.3	5.7
District hospitals***	13.3	14.3
Rural hospital and RHCs ****	8.9	9.5
Councils & Voluntary Org'ns	7.8	7.2
Preventive Services	15.3	11.2
Other !	0.7	7.3

Notes: *central hospitals (quaternary), **provincial hospitals (tertiary), ***secondary level hospital, ****primary care facilities.! Explanation of expenditure item could not be obtained from MOH.
Source: MOH (1997)

Annex I.I: Organisational Structure of the Hospital sector



Annex II: Methods of measuring quality and empirical evidence from LMICs

Literature abounds on methods that can be used for measuring the three aspect of quality discussed above. A few methods amenable to use in LMICs are summarised here.

Quality assessment Methods

The "Staging method" coined by Gonnella and Govan (1975) is based on the classification of patients or cases into homogenous groups so that their progress can be attributed to differences in health care. The method does not focus only on adverse outcomes and investigation of antecedent care, it also considers the stage at which the case first comes in contact with the health care system (e.g. when a patient is admitted into hospital). In this way it provides an idea of the level of effectiveness of the system of care received by the case prior to admission (e.g. at primary care level). With this knowledge it is possible to explain the outcome of hospital care for a particular case taking into account non-hospital events that could have influenced the final outcome. This method is similar to the "trajectory method" (Brook and Stevenson 1970) which is based on selecting a cohort of patients and following their progression through a system of health care so as to note how successfully they attain specified landmarks in the process of care. The only difference with the staging method is that the condition of the case is not noted at uptake into the system.

Williamson's (1978a) approach, the "health accounting" method, is a more systematic method of quality assurance. It is hospital or clinic based, patient specific and focuses on diagnostic categories or specific clinical procedures. Standards are set consensually by doctors for doctors. The method involves four steps: setting of standards, specification of predicted outcomes, measurement of actual outcomes in a sample of patients by a 'health accountant' (e.g. a paramedical), and comparison between actual and predicted outcomes. Any observed difference is called achievable-benefit-not-achieved (ABNA). The goal of quality assurance is to reduce the ABNA gap to zero. The method is based on the understanding that a patient-doctor interaction leads to a diagnostic outcome and to a therapeutic process with a therapeutic outcome. Diagnostic outcomes are classified into true-positives, false-positives and false-negatives (missed diagnosis). Therapeutic outcomes are measured using an index which classifies the overall health and functional status of any given population or group of patients. For example, a hospital can scale outcome for the treatment of a hip fracture as follows: impaired running, impaired walking, impaired climbing, and visible deformity. This method can be applied to all aspects of health care, be it ambulatory or inpatient, acute or long term, as viewed from either the provider or consumer's perspective. Analysis can be at individual or at national level of social aggregation. The underlying premise of the method is that quality assurance must integrate health and management sciences to analyse care benefits and "disbenefits" with the same rigour as profits and loss analysis in a business (Williamson 1988).

Assessment of quality of services can be done using tracers (Kessner et al., 1973). Kessner and colleagues define tracers as "a specific health problem, that, when combined in sets, allow health care evaluators to pinpoint the strengths and weaknesses of a particular medical practice setting or entire health service network by examining the interaction between providers, patients and their environment". The choice of care or conditions to be reviewed is dictated by the circumstances and purposes of the assessment (Donabedian 1985). The main assumption is that there is a relationship between the quality of care of the tracer conditions and other conditions, which the tracer represents. The tracers whose trajectories are to be delineated are first rigorously systematised by a matrix, which defines the features of the health care system concerning which information is sought. Secondly, criteria and standards of assessment are specified. Thirdly, the necessary data should be obtained. Possible data sources are hospital medical records, insurance claims or through primary data collection. The main limitation of using tracers is the amount of generalisation that can be made from the results.

Criteria setting for quality assessment

Common in all the methods discussed above is the use of criteria or standards. Criteria can either be explicit or implicit or a mixture of both. Explicit criteria refer to criteria that are set up by a panel of competent practitioners (experts) based on current clinical science knowledge and experience. They must be expert consensus in setting up such criteria. Implicit criteria are individual sets of rules based on clinical science training and experience of individual medical cadres. Therefore, medical decision making processes are not pre-specified but are based on experience and what is deemed medically correct at a given point in time, and for a given medical problem by the assessor (Donabedian 1982, Mitchell et al., 1997).

The main caveat in the use of explicit criteria in quality assessment is that the criteria must be a good translation of concepts and definitions of quality (structure, process and outcome). As measurement tools their properties determine the reliability, inclusiveness and validity of resulting judgements (Donabedian 1982). Failure to set up appropriate criteria might lead to inappropriate quality assessments and hence ineffective monitoring and quality improvement strategies.

Both types of criteria have merits and demerits. Explicit criteria cost less to use once formulated but are costly to formulate. Pre-specified criteria allow for consistency in professional opinion and uniform judgement of cases. However, they require rigorous analysis of medical literature, experts and consensus building. Consensus can be achieved using methods such as the Delphi technique and others. The main demerit of explicit criteria is that once set they are not easily adaptable. Flexibility can be introduced by using branchings that specify different contingencies (criteria map or algorithmic criteria). On the other hand, implicit criteria are adaptable to individual circumstances. Their main demerits are that they require highly experienced experts, and assessment of cases by different people might create inconsistencies. The lack of a common framework of analysis can create difficulties in making generalised comments on the quality of care and what actions to take. In order to maximise benefits from both types of criteria, Donabedian (1985) suggests that both can be used. Explicit criteria can be used as a screening process by which cases that deserve further review using implicit criteria are identified. The effectiveness of this approach depends on the level of specificity[100] and sensitivity[101] of explicit criteria used.

Quality assessments studies in LMIC

Literature on quality of hospital care studies in industrialised countries is vast. A variety of quality of care indicators are used in the studies: e.g. risk adjusted mortalities, re-admission rates, infection rates, and complication rates. There has been growing interest in the use of outcomes in hospital quality assessment. In developing countries, relatively fewer studies have been down and indicators of quality used in the studies have been largely structural and process aspects of care. Quality of health care studies in developing countries from 1981 to 1993 are extensively reviewed by (1995). Table A2.1 is an updated version of De Geyndt compilation.

What is striking is that all the quality assessment studies reviewed by De Geyndt up until 1993 looked at structural and process aspects of care, with none looking at outcome aspects. One of his explanations was that ".researchers with a strong background in economics seem to prefer quantifiable and measurable inputs..". It would seem, however, that quality assessment studies in LMICs are in the main only feasible when one looks at structure and process assessment. Furthermore, in countries where resources and the necessary infrastructure is deficient, it seems realistic that the mere availability of inputs and an idea of the process of care provides a fair picture of the quality of care. As he rightly argues, outcome measures are the most desirable indicators of quality but because of lack of appropriate tools and the tenuous cause-effect

[100] "Specificity" in this case means the proportion of non-questionable cases they correctly exclude from further review.
[101] "Sensitivity" means the proportion of questionable cases they correctly refer for further review.

relationship between process and outcome few studies have been done. The attribution problem is exacerbated by poor living conditions in which the users of services generally live in. Therefore, it takes no other profession to do outcome assessments under such circumstances of data inadequacy or the expense involved in doing such assessments. This is the main reason why even after 1993 studies on quality are still focusing on structural and process. However, there is evidence there is emerging evidence on use of outcomes (Weakliam at al.1994, Bitran 1995, Broomberg 1997).

Table A2.0 Quality of Health Care Studies in LMICs

Year	Country	Author	Indicator used	Unit of analysis
1981	Ghana	Amonoo-Lartson	Process	rural clinic
1985	Ghana	Amonoo-Lartson	Process	rural clinic
1986	PNG	Pust and Burrell	Process	health centres
1988	Jamaica	Walker et al.	Process	hospital
1989	All	WHO	Process	PHC setting
1989	India	Ghei	Structure	teaching hospital
1990	PNG	Garner et al.	Structure	Health centrel
1990	8 countries	Burns et al.,	Process	PHC setting
1991	Dominican Rep	Lewis et al.,	Structure	hospital
1991	PNG.	Thomason/Edwards	Structure	hospital
1991	Zaire/Zimb.	Wishik	Structure	urb/rur clinics
1991	Bangladesh	Begum	Process	hospital
1991	Ecuador	Robertson et al.,	Str/Proc	rural clinics
1991	Phillippines	Peters/Becker	Str/Proc	hospital
1991	12 countries	Nicholas et al.,	Process	PHC setting
1992	Angola	Bjorck	Process	health centre
1992	Nigeria	Kim	Process	FP clinic
1992	Brazil	World bank	Structure	hospital
1992	China	Kaufman et al.,	Str/Process	rural clinics
1992	Bang/Egypt/VN	Forsberg et al.,	Process	PHC setting
1993	Kenya	Mwabu	Structure	rural centres
1993	Phillipines	Loevinsohn et al.,	Process	rural centres
1993*	Ghana	Haran et al.,.	Str/Process	Hospital OPD
1994*	Ghana	Weakliam,	Str/Proc/Outcome	Health Centres
1994*	Tanzania	Gilson et al.,	Str/Process	Health centres
1995*	Morocco	Brown et al.,	Str/Process	FP/delivery/Pts
1995*	Kenya	Gilson et al.	Structure	PHC setting
1995*	Senegal	Bitran R	Str/Proc/Outcome	Hosp/PHC facilities
1996*	Zimbabwe	Needleman et al.,	Structure	hospital
1996*	Ghana	Govindaraj et al.,	Structure	hospital
1996*	India	Chawla/George	Structure	hospital
1996*	Kenya	Collins et al.,	Structure	hospital
1997*	Zimbabwe	Mills et al.,	Structure	hospital
1997*	South Africa	Broomberg	Stru/Proc./outcome	hospital

Source: Updated table from De Geyndt (1995)
Notes: * added studies

Table A2.1: Activities within Management Functions

Management Functions	Specific Activities
B. Hospital Domain:	
Strategic Management	Mission Definition, Strategic planning, Operational guidelines, asset management
Financial Management	Resource planning, mobilisation, allocation, accounting, devolved/central budgets
Human Resource Management	Incentive structures, tensions, coping strategies
Procurement	External procurement of inputs, internal distribution, equipment/technology, and accountability structures
Administration	All other day-to-day management activities required in implementing hospital mission and running the hospital, such as: time schedules, space allocation, information management, and public relations.
Clinical Practice	Level of autonomy, treatment guidelines, medical audits

Source: Adapted from Chawla et al., (1996).

Table A4: Estimates of Total Expenditure on Health care - Financial Year 1994/5

Public Sector	Z$ million	Percentage
MoHCW	1 067	29.0
Other Ministries	171	4.7
Local Government	194	5.3
Donors	450	12.2
Total Public Sector	**1 882**	**51.2**
Private Sector		
Individual direct payments	1 119	30.5
Health Insurance benefits	432	11.8
Employer based care	208	5.7
Missions and other NGOs	33	0.9
Total Private Sector	**1 792**	**48.8**
Total Health Spending	3 674	100

Source: Schwartz and Zwizwai 1995

Annex VI: Step Down Analysis of Hospital costs

Different sources of expenditure data are used in this method making it laborious (central, local and other ministries' records). In most cases, data is in aggregated form making it difficult to reconstruct actual expenditures. However, the process of reconstructing costs and showing resource flows has the attendant advantage that hospital managers can identify main resource consumption points, and how to properly allocate resources.

The first step is to ensure that total recurrent expenditure is established. This involves looking at line item expenditures, and adding other expenditures incurred by the hospital but paid for elsewhere. Other costs like depreciation and costs of donated goods have to be added. The next step in the estimation is to allocate these costs to cost centres. These vary from one context to the other. Generally there are three categories of cost centres (Barnum and Kutzin 1993):

(a) **Overheads**: these are centres that produce services that are consumed by other cost centres and not directly by patients (e.g. administration, maintenance and utilities).

(b) **Intermediate**: these are departments that produce services that are consumed by other departments and also directly by patients. These include diagnostic services (laboratory, x-ray), theatre, pharmacy, laundry, kitchen, physiotherapy and others.

(c) **Final**: these are the primary departments that provide direct services to patients only. These consist of inpatient and outpatient departments. Inpatients can be disaggregated into specific wards such as obstetrics-gynaecology, medicine, surgery and paediatrics.

Step down costing method can be shown algebraically as follows:

let C_{iO} =direct cost in Overhead cost centre *i*;
C_{jI} = direct cost in Intermediate cost centre *j*; and
C_{kF} = direct costs in Final cost centre *k*.

The direct costs are the costs attributed to each cost centre prior to their allocation to the cost centres associated with hospital outputs. After C_{iO}, C_{jI} and C_{kF} are established the step down method is applied to allocate all costs to final cost centres. The allocation method should reflect the consumption of resources of the source department by the receiving department (i.e. the apportionment of kitchen costs should be based on the proportion of patient days or actual meals consumed in each ward). First to be allocated are overhead costs to all other cost centres. Allocation of overhead costs is based on proportions that can be represented as

α_{ij} = the proportion of p of Overhead cost centre *i*'s costs "used" by Intermediate cost centre *j*;
α_{ik} = the proportion p of Overhead cost centre *i*'s costs "used" by Final cost centre *k*;
$Þ_{jk}$ = the proportion of p of Intermediate cost centre *j*'s costs "used" by Final cost centre *k*;

where

$$\Sigma\alpha_i = 1 \qquad \Sigma Þj = 1$$

In the first step the overhead costs are allocated to intermediate and final cost centres using allocational proportions α_{ij} and α_{jk}, resulting in the first step allocated cost, C'_{jI} and C'_{kF}.

Explicitly,

$$C'_{jI} = C_{jI} + \Sigma\alpha_{ij}.C_{iO}$$

$$C'_{kF} = C_{kF} + \Sigma\alpha_{ik}.C_{iO},$$

where

C'_{jI} = fully allocated costs of Intermediate cost centre j; and C'_{kF} = partially allocated costs of Final cost centre k.

In the second step, the allocated ("indirect") costs from the intermediate cost centres in the first step are allocated among the final cost centres using proportions $Þ_{jk}$. The fully allocated costs are

$$C''_{kF} = C'_{kF} + \Sigma Þ_{jk}.C'_{jI}$$

where

C''_{kF} = fully allocated costs of final cost center k.

Once all the costs have been allocated to final cost centre, average costs are then calculated using appropriate activity statistics as denominators. Average costs of Intermediate cost centres can also be calculated if the relevant service statistics are available.

Table A6.0 The generic anatomy of a tertiary hospital in Zimbabwe

Service Departments	Medical and non-medical support departments
Male Medical Ward	Laboratory
Male Surgical Ward	Physiotherapy
Male Orthopaedic Ward	Kitchen
Female Medical Ward	Mortuary
Female Surgical Ward	Central Steam Sterilisation Unit (CSSD)
Female orthopaedic ward	Radiography
Children Medical Ward	Administration
Children Surgical Ward	Pharmacy
Gynaecology Ward	Storerooms
Post-natal ward	Workshops
Maternity Ward	
Intensive Care Units, Eye Unit, Dental Unit	
Outpatient/Casualty/Observation	

Table A6.1 Hospital unit costs (excluding capital costs) by department across the hospitals, 1997/98FY (ZW$)

Hospital	Ward/	Male medical	Male Surgical	Female medical	Female Surgical	Children Medical	Children Surgical	Maternity
1	Patient days	315	315	344	344	377	377	504
	Admissions	2,446	1,652	972	1,754	1,157	2,122	1,610
	Per Bed	136,719	97,423	114,303	111,402	85,968	162,649	215,832
5	Patient days	502	438	408	343	434	418	464
	Admissions	2,547	4,153	2,371	2,850	1,995	3,538	1,228
	Per Bed	180,112	116,039	123,273	116,374	120,605	212,031	185,979
6	Patient days	437	415	424	395	441	408	482
	Admissions	2,997	4,358	2,146	3,629	3,068	5,204	2,497
	Per Bed	111,949	167,385	91,404	158,392	117,726	195,686	127,518
2	Patient days	166	161	169	172	160	153	158
	Admissions	895	1,304	608	1,068	629	1,065	572
	Per Bed	18,770	27,392	35,178	64,831	43,645	73,460	75,085
3	Patient days	526	292	385	347	409	363	311
	Admissions	2,287	1,942	1,723	2,808	3,037	1,470	2,060
	Per Bed	117,010	87,578	89,216	89,433	116,910	101,899	280,870
4	Patient days	384	459	400	401	408	371	433
	Admissions	2,848	3,426	2,425	2,349	1,698	2,828	1,685
	Per Bed	106,605	100,954	111,787	88,154	84,428	140,269	286,473

Table A6.1 Hospital unit costs (including capital costs) by department across the hospitals, 1997/98FY (ZW$)

Hospital	Ward	Male Medical	Male surgical	Female medical	Female surgical	Children medical	Children surgical	Maternity
1	Patient days	380	380	390	380	468	461	602
	Admissions	2,955	1,996	1,100	1,936	1,438	2,600	1,923
	Per Bed	165,204	117,719	129,435	122,940	106,801	199,313	257,770
5	Patient days	668	585	549	451	603	589	639
	Admissions	3389	5545	3191	3751	2774	4979	1691
	Per Bed	239665	154922	165920	153168	167689	298351	256148
6	Patient days	551	505	517	475	554	489	651
	Admissions	3782	5297	2617	4356	3713	6246	3376
	Per Bed	141245	203450	111468	190122	1425	234861	172457
2	Patient days	388	353	375	431	270	251	282
	Admissions	2091	2852	1346	2673	1058	1750	1023
	Per Bed	43827	59900	77918	162330	73449	120712	134181
3	Patient days	680	389	456	432	433	507	361
	Admissions	2957	2588	2043	3493	1752	3765	2387
	Per Bed	151307	116711	105812	111222	121450	144952	325461
4	Patient days	436	525	441	463.16	458.35	421	480
	Admissions	3240	3924	2677	2715	1906	3210	1870
	Per Bed	121282	115606	123402	101915	94784	159209	317813

Table A6.3 Descriptive statistics of ward recurrent cost per admission by hospital, 1997/8 (ZW$)

Hospitals	Range		Mean	SD	CV
	Min.	Max.			
1	972	2,446	1,673	511	0.31
2	572	1,304	877	283	0.32
3	1,723	3,037	2,190	566	0.26
4	1,685	3,426	2,466	634	0.26
5	1,995	4,153	2,669	968	0.36
6	2,146	5,204	3,414	1,071	0.31

Annex VII.I. Explicit quality criteria for smear positive pulmonary tuberculosis (PTB)

NOTES: *Category 1*: Newly diagnosed pulmonary TB sputum positive/ "negative". Seriously ill extra-pulmonary TB cases e.g. miliary TB, TB pericarditis, peritonitis, bilateral or extensive pleural TB, TB of the spine with neurological complications, TB meningitis and genitourinary TB
Signs & symptoms: persistent cough for three weeks, fever, chest pain, difficulty in breathing and loss of weight (any of these).

PATIENT CODE NUMBER: ☐ DATE: ☐

(A) Background Data:

Age: ☐ Sex: ☐ Referred: Yes ☐ No: ☐ First Contact: Yes ◯ No: ◯ Weight/Kg ☐

Medical/Surgical history: ....

....

....

Patient Management (Process Aspects): **Score: 0,1,2,3**

Arrival Time[102]: ☐ Time of Contact with Staff: ☐

Sputum collection[103]:

Patient was told reasons for collection of sputum[104]: Yes ☐ No: ☐ Yes = 1, No = 0

Sputum collected in the open air/well-ventilated room: Yes: ☐ No: ☐ Yes = 1, No = 0

[102] Time of arrival will be noted where possible.
[103] Sputum taken before admission—possibly the third
[104] Obtained through asking the patient

Specimen collected under supervision of a competent person: Yes: ☐ No: ☐ Yes = 1, No = 0

Laboratory turnaround time[105]: ☐ hrs/days Within 1 hr =1, > 1hr = 0

X-Ray taken: Yes: ☐ No: ☐ Yes = 1, No = 0

X-Ray results turnaround time: ☐ Hrs ☐ Within 24hrs=1,>24hrs= 0

Adults:

Drug type[106]: H ☐ R Z E/S HRZE/HRZS=3, Other Mix =0

Drug dosage per day for the **Intensive Phase**:

Weight	*H*	*R*	*Z*	*E or S*[107]	
<33 kg	☐ mg	☐ mg	☐ mg	☐ mg	[H=200,R=300,Z=1000, E=800]=3, Other = 0
33 to 50 kg	☐ mg	☐ mg	☐ mg	☐ mg	[H=300, R=450, Z=1500, E=800]=3, Other=0
>50 kg	☐ mg	☐ mg	☐ mg	☐ mg/g	[H=300, R=600, Z=2000, E=1200]=3, Other=0

105 Time turnaround - Time lapse from specimen taking to return of results

106 H = Isoniazid, R=Fifampicin, Z=Pyrazinamide, E=Ethambutol, S=Streptomycin

107 Streptomycin injections = (< 33 kg give 500 mg, 33-50 kg give 750 mg, > 1000 mg give 1000mg or 1 g)=3, Other = 0

Children (>5 kg):

Drug type[108]: H ☐ R ☐ Z ☐ — HRZ= 3, Other drug mix = 0

Dosage for Intensive phase:

Weight	*H*	*R*	*Z*	
5-10kg	☐ mg	☐ mg	☐ mg	[H=50,R=75,Z=250]=3, Other=0
11-20 kg	☐ mg	☐ mg	☐ mg	[H=100,R=150,Z=500]=3, Other=0
21-30 kg	☐ mg	☐ mg	☐ mg	[H=200,R=300,Z=1000]=3, Other=0

Treatment Directly Observed: Yes ☐ No ☐ — Yes = 1, No = 0

Is there patient privacy: Yes ☐ No: ☐ — Yes = 1, No =0

(C) Other Process Factors:

Personal Hygiene:

Patient bathed: Yes ☐ No: ☐ — Yes = 1, No = 0

If Yes. Bed Bathed: ☐ Assisted up bath: ☐ Up Bath: ☐

Oral Care: Self: ☐ Assisted: ☐ How often: ☐ — 4 hourly = 1, >4 hourly = 0

Elimination:

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[108] H = Isoniazid, R=Fifampicin, Z=Pyrazinamide, E=Ethambutol, S=Streptomycin

Monitoring of bladder care (Intake & output): Yes: ☐ No: ☐ — Yes = 1, No = 0

Monitoring of bowels care: Frequency: ☐ per day

Nutrition:

Frequency of meals: ☐/day — Thrice/day =3,Twice/day=2,Once/day=1,None =0

Patient assisted in feeding: Yes ☐ No ☐ — Yes = 1, No = 0

Food Quality: Balanced diet ☐ Unbalanced diet: ☐ Poor: ☐ — Balanced=2,Unbalanced=1,Poor=0

Environmental Hygiene

Changing of bed linen: ☐ per day — Once =1, None = 0

Bed linen clean[109] : Yes ☐ No ☐ — Yes = 1, No = 0

Ward cleanliness Satisfactory ☐ Unsatisfactory ☐ — Satisfactory = 1,Not satisfactory= 0

Patient information

Patient Record Keeping: Completeness: Satisfactory ☐ Unsatisfactory ☐ — Satisfactory = 1,Not satisfactory= 0

Accuracy: Satisfactory ☐ Unsatisfactory ☐ — Satisfactory = 1,Not satisfactory= 0

(D) Structural Factors

[109] Clean means unsoiled, unstained and laundered

Frequency of drug stock-outs: H ☐ R ☐ Z ☐ E/S ☐ times in the last six months

Availability of toilets: Adequate ☐ Inadequate ☐ Adequate = 1, Inadequate = 0

Cleanliness of toilets: Satisfactory: ☐ Unsatisfactory: ☐ Satisfactory = 1, Unsatisfactory = 0

Availability of safe water: Adequate ☐ Inadequate ☐ Adequate = 1, Inadequate = 0

Availability of lighting: Adequate ☐ Inadequate ☐ Adequate = 1, Inadequate = 0

Avail. of hand washing facilities: Adequate ☐ Inadequate ☐ Adequate = 1, Inadequate = 0

Presence of floor beds: Yes: ☐ No: ☐ Yes = 1, No = 0

Availability of microscopes: Adequate: ☐ Inadequate: ☐ Adequate = 2, Inadequate = 0

Condition of microscopes: Functional ☐ Non-functional: ☐ Functional = 1, Non-functional = 0

Condition of buildings: Good[110]: ☐ Adequate[111] ☐ Poor: ☐ Good = 2, Adequate = 1,poor =0

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[110] Good = not leaking, spacious, well ventilated & intact walls

[111] Adequate = spacious and not leaking,. Poor = leaking, wall paint peeling off, crowded & not well ventilated

Staff Availability (FTE[112]) per day:

Nurses' time	☐	Hours	Numbers & mix
Doctors time	☐	Hours	Number of patients in the ward

Condition of Patient at discharge:	Ill:	☐	Days of admission before death:	☐
	Recovered	☐		
	Partially recovered[113]:	☐		
	Dead:	☐		

Length of stay in hospital: ☐ days

[112] FTE = Full Time Equivalent
[113] Based on simplistic physical outlook of the patient.

Annex VII.II. Explicit quality criteria for malaria [Simple and Severe]

NOTES: Recruit all cases of malaria that are hospitalised, **NOT** ambulatory cases
Severe and complicated malaria is a life threatening condition requiring immediate therapy to prevent death.
Signs: prostration, persistent vomiting or the slightest sign of alteration in consciousness state, which may indicate cerebral malaria.

PATIENT CODE NUMBER: ☐ DATE: ☐

Background Data:

Age: ☐ Sex: ☐ Referred: Yes ☐ No ☐ First Contact: Yes: ☐ No: ☐

Case Medical/Surgical History: ....
....
....

Patient Management: **Score: 0, 1,2,3**

Arrival Time: ☐ Time of Contact with Staff: ☐

Blood slide taken: Yes ☐ No: ☐ Yes = 1 No = 0

Laboratory turnaround time[114]: ☐ minutes/days Positive/Negative ☐ Within 1 hr =1, > 1hr = 0

Patient weighed Yes ☐ No: ☐ Yes = 1 No = 0

---

[114] Time turnaround - Time lapse from specimen taking to return of results

Drug Choice: Chloroquine [ ]	Other: [ ]	Chloroquine = 3, Other = 0

Chloroquine dosage:

Adult(4 doses) [ ]	mg base/tablets initially	600 mg (4 tablets) = 3, Other = 0
[ ]	mg base/tablets 6 hours later	300 mg (2 tablets) = 3, Other = 0
[ ]	mg base/tablets/day. For how long: [ ] *Days*	300 mg (2 tablets) = 3, Other = 0
[ ]		For 2 days = 3, Other = 0
Children(4 doses) [ ]	mg base/kg or ml syrup/kg initially	10 mg base/kg(1 ml syrup/kg)=3, Other=0
[ ]	mg base/kg or ml syrup/kg 6 hours later	5 mg base/kg(0.5 ml syrup/kg)=3,Other=0
[ ]	mg base/kg or ml syrup/kg daily For how long: [ ] Days	5 mg base/kg(0.5 ml syrup/kg)=3,Other=0

If there is no improvement after 24-48 hours:

Drug choice: Fansidar: [ ]	Other (Specify): [ ]	Fansider=3, Other = 0

Fansidar (sulphadoxine + pyrimethamine):

Adults: >60 kg [ ]	Tablets	3 tablets = 3, Other = 0
<60 kg [ ]	Tablets	2 tablets = 3, Other = 0
Children: 0-4 yrs [ ]	Tablets	0.5 tablet = 3, Other = 0
5-6 yrs [ ]	Tablets	1 tablet = 3, Other = 0
7-9 yrs [ ]	Tablets	1.5 tablets = 3, Other = 0

If there is no improvement after 24-48 hours with Fansider/patient deteriorating or still slide positive:

Drug choice: Quinine (O) & Doxycycline (O): [ ]	Other: [ ]	Quinine & Doxy. = 3,Other=0

Dosage (***Quinine***): Adults: ☐ mg (salt) — 600 mg = 3, Other = 0

Children: ☐ mg/kg (salt) — 10 mg/kg = 3, Other = 0

Treatment taken for how many days: ☐ days — 7 days = 3, Other = 0

Doxycycline: Adults: ☐ mg/day — 100 mg = 3, Other = 0

Children (>8yrs): ☐ mg/kg/day — 2 mg/kg = 3, Other = 0

Treatment taken for how many days: ☐ days — 7 days = 3, Other = 0

If condition is deteriorating and there are any of the complications indicated below, consider IV quinine for complicated malaria:

Complications: Cerebral malaria: ○	Bleeding tendencies : ○	Severe anaemia: ○	Hyperpyrexia: ○
Jaundice: ○	Shock: ○	Severe haemoglobinuria: ○	Hyperparasitaemia: ○
Acute renal failure: ○	RespiratoryDistress ○	Distress and hypoglycaemia: ○	

Drug Choice: Quinine: ☐ Other: ☐ Specify: .... — Quinine = 3,Other = 0

Checked use of Quinine in the last 24-48 hrs:Yes: ☐ No: ☐ — Yes = 1, No = 0

Referred to Coma scale (If applicable): Yes ☐ No: ☐ — Yes = 1, No = 0

(A) Quinine (IV Infusion):

Loading:

Loading Dose given[115]: ☐ mg/kg quinine salt	20 mg/kg=3, >or< 20 mg=0 [Max 1200mg]
Given for how long: ☐ hours	4 hrs = 3, >or < 4 hrs = 0
Close monitoring of Infusion[116] Yes: ☐ No: ☐	Yes = 1, No = 0

Maintenance:

Maintenance dose given after: ☐ Hours after loading dose was commenced	8 hrs = 3, < or > 8 hrs = 0
Maintenance dose[117]: ☐ mg/kg	10 mg/kg=3, <or>10mg/kg=0 [Max 600mg]
Period of maintenance dose: ☐ Hrs	4 hrs = 3, > or < 4 hrs = 0
Number of repeat maintenance doses: ☐	6 repeats in 48 hrs of therapy) = 3,< or > 6 = 0
Maintenance dose reduced to 5 mg/kg after how long: ☐ doses	6 doses = 3, < or > 6 doses = 0
If, patient can swallow, given quinine salt orally: Yes ☐ No ☐	Yes = 1, No = 0
If, Yes for how long: ☐ Days	7 days = 3, No = 0

[115] Maximum dose is 1200 mg in 200-500 ml of 5% dextrose for a 60 kg adult
[116] Done through observation of nursing staff responsible
[117] Maximum dose is 600 mg for a 60 kg adult

General Measures[118]:

If patient:

In *Coma*:	Airway maintained: Yes ☐	No ☐	Yes = 1, No = 0
	Nursed in a cot bed: Yes ☐	No: ☐	Yes = 1, No = 0
	Two hourly turns: Yes ☐	No: ☐	Yes = 1, No = 0
	Other causes of coma excluded: Yes ☐	No ☐	Yes = 1, No = 0
Convulsing:	Treated: Yes ☐	No: ☐	Yes = 1, No = 0
	Checked for hypoglycaemia:Yes ☐	No: ☐	Yes = 1, No = 0
Hypoglycaemic:	Monitored blood glucose screening: Yes ☐	No: ☐	Yes = 1, No = 0
	Given dextrose 50% 1ml/kg in children: Yes ☐	No: ☐	Yes = 1, No = 0
	Given dextrose 20-30 ml in adults followed by dextrose 10% infusion : Yes ☐	No: ☐	Yes = 1, No = 0
Severely anaemic:	Transfusion of packed cells if HB<6g/dI: Yes ☐	No: ☐	Yes = 1, No = 0
Has *acute pulmonary oedema*:	Reviewed fluid: Yes ☐	No: ☐	Yes = 1, No = 0
	Close monitoring of infusion rates: Yes ☐	No ☐	Yes = 1, No = 0

[118] To be done through observations and checking patient notes

If over hydrated, given IV frusemide: Yes ☐ No ☐ Yes = 1, No = 0

Did a lumber puncture to check for meningitis: Yes ☐ No ☐ Yes = 1, No = 0

<u>(C) Other Process Factors</u>:

Personal Hygiene

Patient bathed: Yes ☐ No: ☐ Yes = 1, No = 0

If Yes, Bed Bathed: ☐ Assisted up bath: ☐ Up Bath: ☐

Oral Care: Yes ☐ No: ☐ Yes=1, No = 0

Frequency of oral care: ☐ /day At least once/day = 1, Other = 0

Elimination

Monitoring of bladder care (Intake & Output): Yes ☐ No ☐ Yes = 1, No = 0

Monitoring of bowels care: Frequency ☐ day

Nutrition

Frequency of meals: ☐ /days Thrice/day =3, Twice/day =2, Once/day = 0

Patient assisted in feeding: Yes ☐ No ☐ Yes = 1, No = 0

Food Quality: Balanced diet ☐ Unbalanced diet: ☐ Poor: ☐ Balanced = 2, Unbalanced = 1, Poor = 0

Environmental hygiene

Changing of bed linen: ☐ per day Once = 1, Nil =0

Bed linen clean : Yes ☐ No ☐ Yes = 1, No = 0

Ward cleanliness: Satisfactory ☐ Unsatisfactory ☐ Satisfactory = 1, Not satisfactory = 0

Patient Information

Patient Record Keeping: Completeness: Satisfactory Satisfactory Satisfactory = 1, Not satisfactory = 0

Accuracy: Satisfactory Satisfactory Satisfactory = 1, Not satisfactory = 0

(D) Structural Factors

Freq of drug S/O: Choroquine ☐ Quinine ☐ Fansidar ☐ times in the last 6 months. 0=> once, 1=1, 2=0

Availability of toilets: Adequate ☐ Inadequate ☐ Adequate = 1, Inadequate = 0

Cleanliness of toilets: Satisfactory: ☐ Unsatisfactory: ☐ Satisfactory = 1, Unsatisfactory = 0

Availability of safe water: Adequate ☐ Inadequate ☐ Adequate = 1, Inadequate = 0

Availability of lighting: Adequate ☐ Inadequate ☐ Adequate = 1, Inadequate = 0

Avail. of hand washing facilities: Adequate ☐ Inadequate ☐ Adequate = 1, Inadequate = 0

Presence of floor beds: Yes: ☐ No: ☐ — Yes = 1, No = 1

Availability of microscopes: Adequate ☐ Inadequate ☐ — Adequate = 1, Inadequate = 0

Condition of microscopes: Functional ☐ Non-functional ☐ — Functional = 1, Non-Functional=0

Condition of buildings: Good ☐ Adequate ☐ Poor: ☐ — Good = 2, Adequate = 1, Poor = 0

Staff FTE per day:

Nurses : ☐ Hours — 0=<12.3 hrs per day, 3=>12.3hrs per day

Doctors: ☐ Hours — 0=<0.4 hrs per day, 3=>0.4 hrs per day

Condition of Patient at discharge:

- Ill: ☐
- Recovered: ☐
- Partially recovered[119]: ☐
- Dead: ☐

Days of admission before death: ☐

Length of stay in hospital: ☐ days

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[119] Based on simplistic physical outlook of the patient.

Table A8.0 Broad Weighted Criteria for the Tracers

Quality Cluster	Weighting	# Valid variables	Expected Score	PPI (0-1)
a) Pulmonary Tuberculosis				
Structural factors:	30 (56%)	18	1.46	1
Staff availability (11%)				
Drug availability (19%)				
Physical Environment (26%)				
Process Factors:	24 (44%)	19	1.58	1
Diagnosis (11%)				
Therapy (19%)				
Patient & environ. (15%)				
Overall Expected Score	54 (100%)	37	1.33	1
b) Simple Malaria:				
Structural factors	24 (32%)	15	1.60	1
Staff availability [6](8%)				
Drug availability [8](11%)				
Phys. Environment [10](13%)				
Process Factors:	52 (68%)	27	1.93	1
Diagnosis [3](4%)				
Therapy [33](43%)				
Patient & environ. [16](21%)				
Overall Expected Score	76 (100%)	42	1.80	1
b) Severe Malaria:				
Structural factors	18 (28%)	12	1.5	1
Staff availability [6](9%)				
Drug availability [2](3%)				
Phys. Environment [10](16%)				
Process Factors:				
Diagnosis [3](5%)	46(72%)	27	1.70	
Therapy [28](44%)				
Patient & environ. [15](23%)				
Overall Expected Score	64 (100%)	39	1.64	1

Table A8.1 Weighted criteria for calculation of the weighted mean score/Provider Performance Index

Criteria	Simple Malaria		Severe Malaria	
	Weighting	Total	Weighting	Total
Laboratory				
Blood slide for MPs	1		1	
Laboratory turnaround time	1		1	
Weighing of patient[120]	1		1	
Total possible laboratory score		**3**		**3**
Treatment***				
Administration of:				
Chloroquine	9		*	
Or pyrimethamine & sulphadoxine (po)	9		*	
Or quinine (o)	9		*	
Plus (optional doxycycline (po))	6		*	
If complicated:				
First choice drug quinine	*		3	
Checked previous use quinine	*		1	
If applicable referred to coma scale	*		1	
IV quinine loading dose	*		3	
Duration of loading dose	*		3	
Close monitoring of infusion	*		1	
Time lapse before maintenance dose	*		3	
Maintenance dosage	*		3	
Period of maintenance dose	*		3	
Number of repeat doses	*		3	
If pa't can swallow, quinine given orally	*		1	
Duration of quinine (o)	*		3	
Total possible treatment score		**33**		**28**
General measures:				
If in coma, airway maintained		*	1	
Nursed in cot bed		*	1	
Two hourly turns		*	1	
Other causes excluded		*	1	
If convulsing, treated appropriately		*	1	
Checked for hypoglycaemia		*	1	
Monitoring of blood glucose screening		*	1	
Given dextrose 50% 1ml/kg (diluted 1 to 1 in children)		*	1	
or 20-50 ml in adults followed by dextrose infusion		*	1	
If anaemic, transfusion of packed cells in HB<6g/dl		*	1	
If having acute pulmonary oedema				
Reviewed fluid balance		*	1	
Monitored infusion rates carefully		*	1	
If overhydrated, given IV frusemide		*	1	
Lumbar puncture for meningitis		*	1	
Total possible general score				**14**
Nursing Services:				
Personal hygiene	3		2	
Elimination	2		2	
Nutrition	6		6	
Environmental hygiene	3		3	
Patient records	2		2	

120 Not necessarily a laboratory activity but a necessary precursor to effective treatment

Total possible nursing score		**16**		**15**
Structural Factors				
Availability of antimalarial drugs	8		2	
Availability of toilets	1		1	
Cleanliness of toilets	1		1	
Availability of safe water	1		1	
Availability of lighting	1		1	
Availability of hand washing facilities	1		1	
Availability of floor beds	1		1	
Availability of microscopes	1		1	
Condition of microscopes	1		1	
Condition of buildings	2		2	
Availability of staff (nurse & doctors)	6		6	
Total possible structural score		**24**		**18**
Total weighted score		**76**		**79**

Notes: * process factor, ** structural factor, ***drug choice, dosage and duration criteria

Table A8.2. Staff Availability by Category, Provincial Hospital 1997

Staff Category	[1] (171 beds)	[2] (160 beds)	[3] (250 beds)	[4] (235 beds)	[5] (223 beds)	[6] (156 beds)	Norm (200 beds)
Specialists	1	0	4	0	6	2	7
GMOs	7	6	8	7	9	5	10
Med. Sup.	1	1	1	1	1	1	1
RGN/SCN	110	123	350	225	189	76	293
Pharmacist	2	2	2	1	1	1	2
Pharmacist Tech.	1	4	1	2	3	2	5
Matrons	1	1	2	0	2	3	2
Therapists	1	3	4	5	5	1	6
Orthopaed. Tech	0	0	0	0	1	0	1
Rehab. Tech.	2	4	3	4	4	4	4
Lab.Technologist	1	2	3	2	6	2	6
Dietician	0	0	0	0	0	0	1
Radiographer	2	2	2	3	3	2	5
X-Ray Operator	1	0	0	0	0	2	2
Clin.Pyschologist	0	0	0	0	0	0	2
Med. So. Worker	0	1	1	0	0	0	2
Inst. Dom.Super.	2	2	2	3	2	2	4
Hosp.Admin[b]	1	1	1	1	1	1	1
Clerical & Secre	10	11	18	11	14	9	21
Ancillary	50	66	167	82	146	57	95
Nursing Students	60	-	120	119	39	-	-
Inpatients	60247	45199	73956	68301	74990	46772	

Table A8.3. Staff to facility ratios in clinical care facilities

Staff Category	[5]	[1]	[4]	[3]	[6]	[2]	Norms
Specialists	6	1	0	4	2	0	7
Medical Sup.	1	1	1	1	1	1	1
Matrons	2	1	2	2	3	2	2
Therapists	5	1	5	4	1	3	6
Rehab. Tech.	4	2	4	3	4	4	4
Orthopaedic Tech.	1	0	0	0	0	0	1
Dietician	0	0	0	0	0	0	1
Clin.Pyschologist	0	0	0	0	0	0	2
Equipment tech.	0	0	0	0	0	0	4
Hosp.Admin	1	1	1	1	1	1	3
Med. Soc. Worker	0	0	0	1	0	1	2

Annex VIII: drug availability at provincial hospitals July 97-June 98

Hospital name:..

NAME OF DRUG	FREQ. of STOCK-OUTS	PERIOD OUT OF STOCK		
		< 2 weeks	2-5 weeks	> 6 weeks
Chloroquine				
Fansider				
Quinine (Tablets)				
Quinine (Injectibles)				
Doxycycline				
Isoniazid				
Ethambutol				
Rifampicin				
Pyrazinamide				
Bupivacaine				
Lignocaine				
Methyldopa				
Reserpine				
Indomethacin				
Ibuprofein				
Cotrimoxazole				
Oxytocin				
Nifedipine				
Ergometrin				
Lithium Carbonate				
Benzylpenicillin				
Metronidazole				
Insuline Soluble				
Insulin Zinclente				
Postaglandin E2 (dinoprostone)				
Procaine penicillin				
Dextrose				
Ringers Lactate				
Normal Saline				
Gentamycin				
Phenobarbitone				
Paracetamol				
Sutures*				
Maintelyte				

Notes: "Very Satisfactory" means 80 -100% of the drugs never out of stock in a year. "Satisfactory" means 60 - 79% of drugs never out of stock a year. "Unsatisfactory" means less than 60% of drugs never out of stock in a year. * Not a drug but an essential surgical input. Check all types

Annex IX: Minimum acceptable level of tracer Inputs for acceptable quality

A) Pulmonary Tuberculosis[121]

Case definition:	a patient with two consecutive smear examinations or with one positive smear examination and a chest x-ray suggestive of tuberculosis
New case	a patient who never received TB treatment for less than one month

Ideal Patient Treatment Inputs (Key)

Input	Quantity	Comments/Remarks
Doctor's time[122]	At least 24 minutes per patient per day	Calculations done based on the a doctor to patient ratio of 1:20
Nursing time	At least 12.3 hrs per patient per day	Calculations based on a nurse to patient ratio of 1:0.65
General Hand	At least 12 minutes per patient per day	Assuming 40 patients/ ward. 1 GH/ward
Laboratory tests	AFB tests(3 sputum tests)	Based on the national guideline.
Chest X-Ray	1 x-ray	One x-ray taken on admission
Drugs (Category 1)	Isoniazid 100mg each *(3 tablets) per day* Rifampicin 150mg each *(4 tablets)* per day Pyrazinamide 500mg each *(4tbts) per day* Ethambutol 400mg inj or 1g/3 tbs per day	Streptomycin is rarely used
Hotel services	3 meals per day Bedding and linen	
Stationery	1 card per patient	
Expected LOS	7 to 14 nights	7-14 days intensive phase using DOTS (or 60 days Short Term Chemotherapy – Conventional method)

It is estimated that 80-90 percent of TB cases in hospitals are HIV positive. There were no significant variations in this proportion between hospitals.

B) Malaria

Case definitions[123]:

Simple malaria: patient with fever and either lives in or has travelled in a malarial area within the past three weeks.
Severe Malaria: patient presenting with any of the following signs; impairment of consciousness, fits/convulsions, pallor, jaundice, "coca-coal" urine, breathlessness, prostration, low blood pressure, persistent vomiting and bleeding from the mucosa.

a) Simple malaria

Ideal Inputs	Quantity	Comments/Remarks
Staff	Dr: At least 24 minutes per patient per day	Calculations done based on the a doctor to patient ratio of 1:20
	Nurse: At least 12.3 hrs per patient per day	Calculations based on a nurse to patient ratio of 1:0.65
	At least 12 minutes per patient per day	Assuming 40 pts/ward. 1 GH/ward
Laboratory Test	MP (Malaria Parasites) Test: 1	Done at referral centres and not

[121] MoH&CW, 1994. Zimbabwe Tuberculosis Control Programme Manual.
[122] Staff figures derived from the Human Resource Study by the MOH&CW (1999)
[123] From the Revised Standard Treatment Guidelines on Malaria. March 1999. Produced by The Malaria Control Technical Committee on Case Management and Drug sensitivity and endorsed by National Drug and Therapeutics Policy Advisory Committee, Ministry of Health and Child Welfare.

		necessarily at primary care facilities
Drugs	Chloroquine (Adult): 10 tablets (150mg each) Fansider[124] (Adult): 3 tablets Quinine (po): 4 tablets (600mg) every 8 hours for 7 days Paracetamol 24 tablets	Quinine could be given in a short course of 3-5 days in which case Doxycycline (po) is added. 1 tablet (100mg) daily for 7 days. Used long term course since the majority of cases in the cohort had it.
Hotel services	3 meals per day	Cases fed IV considered equivalent to 3 balanced meals/day at ZW$120
	Bedding and linen	Based on LOS
Stationery	1 card per patient	At ZW$13.94 per card
Expected LOS	1-10 days, mean=3 days	Based on cohort cases (n=79)

a) Severe malaria

Ideal Inputs	Quantity	Comments/Remarks
Staff	Dr: At least 24 minutes per patient per day	Calculations done based on the a doctor to patient ratio of 1:20
	Nurse: At least 12.3 hrs per patient per day	Calculations based on a nurse to patient ratio of 1:0.65
	GH: at least 12 minutes per patient per day	Calculations based on a 40 patients ward per day with 1 GH
Laboratory Test	MP (Malaria Parasites) Test: 1	Done at referral centres and not necessarily at primary care facilities
Drugs	IV Quinine (Adult 60kg): Loading dose: 1200mg(2 ampuoles) diluted in 200-500mls of 5% dextrose Maintenance dose: 600mg (1 amp). Six doses over 48 hours= 6 amp of Q Quinine (o) 300 mg for 7 days= 14 tablets (i.e. if patient can swallow) Paracetamol 42 tablets	600mg =2 ml= ampuole Took maximum dose of 1200mg
Hotel services	3 meals per day	Cases fed intravenously considered as those on a having 3 balanced meals a day
	Bedding and linen	Based on LOS
Stationery	1 card/File per patient	
Expected LOS	3-5 days [5 days]	Based on cohort results (n= 95).

Notes:

1. Unlike simple malaria, a typical case of severe malaria could go through the whole treatment regime from simple to complicated malaria. That is why it was necessary to look at the inputs (or costs) and quality scores, as a range or band.
2. Staff time and hotel services vary with length of stay.

[124] Fansider tablet contains 500mg sulphadoxine and 25mg pyrimethamine

Annex X: Interview guide[125]

Interviewees: Medical superintendents, doctors and nurses (Matrons & SICs), and heads of departments (physiotherapy, laboratory, domestic services, dietary services, radiography, infections control, dental services and pharmacy)

a) Background Data:
Current position:…………………. Length of time in your current position………………….
Previous Position:……..………… Length of time in that position…………………………….
Qualifications:………………….. Management team member: YES/NO …………………..

(B) Incentive Structure
1. For how long have you been working here?
2 Do you like it here?
3 Are you satisfied with current remuneration levels?
Why?
3.1 Are they other rewards apart from your salary that you enjoy?
3.2 What strategies do you use for coping with problems of low salary income?
3.3 Do you feel job secure?
Why?
4. How can you move from one grade to the other?
5 What strategies did you use (or do you need) to move up your career structure?
6. What aspects of staff emoluments affect you morale and motivation?
6.1 How can they be changed?
8. How do you cope with problems of high/low workload in the hospital?
Have you received any training (For example, CPE) for your job in the last five years?
10.1 Do you think it is necessary?
10.2 What do you do in order to get it?
11.Apart from what we have discussed so far, what other factors influence your morale and motivation[126]?

c) Relationship between structures, internal factors and hospital performance

i) Governance
12. What are your views on current hospital governance and its effects on: (Explain and Probe):
Decision space:

(2) Management
14. Who are the main decision-makers in this hospital?
14.1. What decisions do you make in the following area:
Financial, Clinical, Personnel, Administration, Input procurement and Others.
15. Are the main decision-makers answerable (and identifiable) for the mistakes or the good decisions they make? [Explain]
16. How are decisions by management communicated to you? [If applicable]
17. Which issues are communicated and which ones are not?[If HE member]
18 How does it affect your work?
19. Are you involved in making important decisions for the hospital? Yes/No
19.1 If Yes, how?

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[125] The objective of the guide is to focus the in-depth interviews to specific areas of interest. It is not a questionnaire. The listed questions do not have to be followed in a sequential order to allow for natural discussions. EXPLANATIONS and further PROBING will be used to follow up issues raised in the interview. What is important is that all the pertinent issues are adequately discussed.

[126] Notes for Researcher: also look out for such issues: "use of public facilities for private purposes", prestige, security, and authority.

20. If Not, what strategies do you use for putting your concerns to management?
21. What must be done to improve the decision making process in the hospital?

(3) Quality

22 Do you see any problems with quality of inpatient services in this hospital
23. What are the major causes of these problems?
4. Why are the problems not resolved?
25. Do you have any role to play in resolving these problems?
26. How can these problems be resolved?
27. Who are the key actors in addressing quality problems?

(4) Costs

Do you see any problems with hospital costs? Yes/No
29. What are the main problems?
30. Why are these problems not resolved?
31. How can they be resolved?
32. Who is responsible for controlling hospital costs?
33. What is your role in cost control?
34. Do you have departmental or functional budgets Yes/No
35. If yes, how do they affect hospital activity?
36. If Not, in what ways are functional budgets likely to affect hospital activity [Explain and discuss]

(D) Views on proposed reforms

37. Is there need to change existing hospital governance? Yes/No Why?
38. How is self governance likely to affect your work
39. How is self-governance likely to affect hospital activities?
40. What problems are likely to occur with hospital autonomy?
41. How can these problems be resolved?
42. Is there need to change existing hospital financing mechanisms?
43. Do you have any form of contracts in the hospital? Yes/No
44. If Yes, for what services?
45. If Not, what is your understanding of use contracts in health services provision
46. How do they work?
47. What aspects of hospital activities are likely to be affected by use of service contracts? [Explain and probe]
48. What problems are likely to occur with use of service contracts?
49. How can they be resolved?

THANK You

Table A10.1. Profile of respondents in the Study, Tertiary Hospitals

Interviewees/Hospitals	1	2	3	4	5	6	Total
General Medical Officers	1	1	-	2	-	1	5
Specialist Consultants	-	-	1	-	1	-	2
Medical Superintendents	1	-	1	1	1	-	4
Matrons[127]	2	-	1	1	1	1	6
Heads of Radiography	1	1	1	1	-	1	5
Heads Laboratory	-	1	1	1	1	1	5
Heads of Physiotherapy	1	-	-	-	-	1	2
Dental Surgeon	1	-	-	-	-	-	1
Heads of Pharmacy	-	1	-	1	1	1	4
Sisters in Charge of Wards	-	2	4	2	1	1	10
Heads of Domestic Services	-	-	-	-	-	1	1
Hospital Administrators	1	1	1	1	1	1	6
Total	8	7	10	10	7	9	51

Table A10.2 Management skills and experience audit across hospitals

Hospital	No. with management training	Average number of years in post
1	4 (50%)	5
2	5 (71%)	5
3	7 (70%)	6
4	2 (20%)	4
5	1 (14%)	9
6	3 (50%)	6

[127] These are nursing managers

Table A10.3 Summary of internal structures and staff views on various subject domains across the study hospitals

Subject domain	Hospital 1	Hospital 2	Hospital 3	Hospital 4	Hospital 5	Hospital 6
Policy prescribed internal organs[128]	HE, PC & EC	HE, HAB, FC, PC, DTC	HE, FC, PC	HE, HAB, FC, PC, FC	HE, PC, HAB, DTC, FC	HE, PC
Membership of HE	Most members not substantive	Full substantive membership	Full substantive membership	Full substantive membership	Most members substantive	Full substantive membership
Functional status of management organs	Non-functional/ Informal	Functional/ Formal	Non-functional/ Informal	Functional/Formal	Functional/Formal	Functional/Formal
Locus of managerial control	Laissez faire	H. Executive	Administrator/ H. Executive	H. Executive	H. Executive	H.Executive/ Administrator
Perceived management style	Autocratic medical superintendent	Participatory	Non-participatory	Participatory	Participatory by design	Participatory
Formal Internal communication	Limited	Limited	Limited	Good	Good except for Drs	Limited
HE internal accountability	Mixed views	Mixed views	Poor	Good	Good	Mixed views
Resource use and accountability	Central control	Central control	Central control	Partially devolved & re-centralised	Central control	Central control: with depart. experiments
Involvement of managers in hospital resource planning	Not involved	Actively Involved	Not involved	Actively involved	Actively involved	Involved
Input procurement system	Dormant PC	Active PC	Active PC	Active PC	Active PC	Active PC
Manag'nt participation level: Doctors Administrators Line managers	 Passive Active/Dominant Passive	 Active Active Active	 Passive Active/Dominant Passive	 Active Active Active	 Active/Dominant MS Active Active	 Passive Active/Dominant Active
Top four perceived Incentives[129]	Job Security Subsidised accom. CPE Diversity of patients	Social Factors Job Security Subsidised accommod. Free Health Services	CPE Free health services Social factors Job security	CPE Social factors Free health services Subsided Food	CPE Free health services Departmental autonomy Access to car loans	CPE Subsidised accommod. Free health services Transport allowances Job Satisfaction
Top four perceived disincentives[130]	Low salaries Random CPE	Low salaries	*Low salaries* Input shortages	Low salaries Input shortages	Low salaries Input shortages	Low salaries Input shortages

[128] These include a hospital executive and hospital advisory board plus a finance committee, procurement committee.
[129] In order of frequency of responses. The top four.

	activities Input shortages Poor perks	*Lack of Managerial support* Exposure to infectious diseases	Overwork Staff tension	Poor infrastructure Lack of valuation of staff	Lack of support from above Lack of accommodation	Lack of accommodation Unclear career paths
Strategies for coping with low income: Doctors Administrators Line managers	Private practice Did nothing Did nothing	Private practice Informal jobs Informal jobs	Private practice Did nothing Pvt practice/Inf.Jobs	Private practice Did nothing Did nothing	No disclosure except one who did private practice	Private practice Did nothing Informal jobs
Strategies for coping with high workload: Doctors Administrators Line managers	Balance pvt/pub. Do just as much Do just as much	Worked extra hrs Worked extra hrs Worked extra hrs	Worked extra hrs Worked extra hrs Worked extra hrs	Do just as much Do just as much Do just as much	Worked extra hours Worked extra hours Worked extra hours	Do our best Do our best Do our best
Incentive alignment	Indeterminate Evid.of clinical dominance	Partial/ Operational harmony	Dislocated	Partial	Partial	Partial
Nature of staff tension	No evidence of overt tension	No evidence of overt tension	Evidence of overt tension	Mixed. Evidence of overt tension	Mixed. Evidence of covert tension	Evidence of covert tension
Views on quality of services	Problems admitted but no desire for local solutions	Problems admitted/solutions external	Problems admitted with external solutions	Admitted problems Proffered internal/ external solutions	Admitted problems but problem perceived to be externally caused	Admitted problems and offered local solutions
Views on cost of services	Indifference	Problems admitted Proffered external solutions	Problem admitted Proffered external solutions	Admitted problems Proffered internal/ external solutions	Admitted problems Proffered internal and external solutions	Admitted problem and local initiative had started
Views on hospital autonomy	pro-reform	Pro-reform	Pro-reform	Against reform	Pro-reform	Pro-reform
Views on Contracting out services	Mixed view. Executives for and HODs against	Against reform	Against reform	Against reform	Pro-reform	Against reform

Key: HE= hospital executive, PC = procurement committee, EF = efficiency committee, DTC= drugs and therapeutic committee, HAB = Hospital Advisory Board, FC = Finance committe

[130] In order of frequency of responses.